LIBRARY
SUPREME COURT, U.S.

No. 640

DEC 4 1957
JOHN T. FEY, Clerk

RECORD

United States Court of Appeals

FOR THE EIGHTH CIRCUIT

Nos. 15,725 and 15,729
CIVIL

BRIGGS & STRATTON CORPORATION,
Appellant,

vs.

CLINTON MACHINE CO., INC.,
Appellee.

CLINTON MACHINE CO., INC.,
Cross-Appellant,

vs.

BRIGGS & STRATTON CORPORATION,
Cross-Appellee.

Appeals from the United States District Court for the Northern District of Iowa

VOLUME I
Pages 1-208

INDEX

Page

VOLUME I

Complaint 2

Answer and Counterclaim 5

Reply to Counterclaim 15

Application of Prior Art Cited 17

Notice of Prior Public Use and Additional Prior Art 19

Notice of Prior Public Use and Sale 21

Notice of Additional Prior Art 22

Trial Proceedings—April 18-22, 1955

Evidence for Plaintiff

Hugh S. Brown
— Direct Examination 23

Kenneth C. Agar
— Direct Examination 31

Hugh S. Brown (Recalled)
— Direct Examination 45
— Cross Examination 57
— Redirect Examination 68
— Recross Examination 69
— Redirect Examination 69

Joseph Robert Harkness
— Direct Examination 69
— Cross Examination 75

E. Eugene Kohls
— Direct Examination 78
— Cross Examination 108

Page

Evidence for Defendant

Deposition of Arthur J. Eaton 118
Deposition of George Rose 118
Clarence Damon
— Direct Examination 123
Bernard J. Cantor
— Direct Examination 126
— Cross Examination 186

Findings of Fact, Conclusions of Law and Order for Judgment 190

Judgment 205

Order Ruling on Post-Judgment Motions of the Defendant 207

VOLUME II

Supplemental Trial Proceedings—June 4-6, 1956

Evidence for Plaintiff

Hugh S. Brown
— Direct Examination 209
— Cross Examination 210
Harry Shore
— Direct Examination 212
— Cross Examination 225
— Redirect Examination 238
— Recross Examination 241

Evidence for Defendant

Deposition of Harold E. Bruns
— Direct Examination 243

Page

— Cross Examination 250
— Redirect Examination 252

Stipulation 256

Clarence P. Damon
— Direct Examination 257

Stipulation 258

Clarence P. Damon
— Direct Examination (Continued) 260

Stipulation 261

Clarence P. Damon
— Direct Examination (Continued) 264

Stipulation 264

Clarence P. Damon
— Direct Examination (Continued) 267

Carl Wolcott
— Direct Examination 268
— Cross Examination 293

Cletus V. Erlacher
— Direct Examination 294

Clarence P. Damon (Recalled)
— Direct Examination 322
— Cross Examination 335
— Redirect Examination 340

Rudolph L. Lowell
— Direct Examination 341
— Cross Examination 364

Leo J. Lechtenberg (Adverse)
— Direct Examination 368
— Cross Examination 385
— Redirect Examination 385

Page

Rebuttal Evidence for Plaintiff

— Stipulation 386

Leo J. Lechtenberg
— Direct Examination 388
— Cross Examination 391

Harry Shore
— Direct Examination 396

Harold E. Bruns
— Direct Examination 397
— Cross Examination 397

Hugh S. Brown
— Direct Examination 398
— Cross Examination 399
— Redirect Examination 402

Deposition of Warren C. Conover
— Direct Examination 402
— Cross Examination 404

Joseph Robert Harkness
— Direct Examination 408
— Cross Examination 410

Ernest A. Longenecker
— Direct Examination 414
— Cross Examination 428
— Redirect Examination 432

Surrebuttal Evidence for Defendant

Clarence P. Damon
— Direct Examination 433

Harold E. Bruns
— Direct Examination 434

Page

Cletus V. Erlacher
— Direct Examination 435

Re-rebuttal Evidence for Plaintiff

Ernest A. Longenecker
— Cross Examination 436

Findings of Fact, Conclusions of Law and Order for Judgment 438

Judgment 463

Notice of Appeal 464

Notice of Cross-Appeal 465

Relevant Docket Entries in District Court 466

EXHIBITS

VOLUME I

Plaintiff's Exhibits

5 — "Chart No. 1" 91

7 — "Chart No. 3" 81

8 — "Chart No. 5" 25

14 — Clinton Specification Sheet 33

14b — Clinton Letter Announcement 35

14c — Clinton General Specifications 37

14d — Blowup of Cuts on 14c 39

14d'— Blowup with Identifying Numerals 47

14e — Photo of Exhibit 4 Engine 41

14f — Photo of Exhibit 4 Engine 43

22 — Sketch—Modified Clinton Casting.....Facing 68

Page

VOLUME II

Defendant's Exhibits

D- 96 — Pages from H. H. Doehler: *Die Casting* 273

D- 98 — Pages from *Designing for Alcoa Die Castings* 283

D-105 — Article from *Southern Hardware*, January, 1951 297

D-109 — Reprint from *Electrical Merchandising*, June, 1951 305

D-110 — Reprint from *Electrical Merchandising*, January, 1956 313

Note: All patent copies are included in Volume III and are separately indexed in that volume.

RECORD

United States Court of Appeals

FOR THE EIGHTH CIRCUIT

Nos. 15,725 and 15,729
CIVIL

BRIGGS & STRATTON CORPORATION,
Appellant,

vs.

CLINTON MACHINE CO., INC.,
Appellee.

CLINTON MACHINE CO., INC.,
Cross-Appellant,

vs.

BRIGGS & STRATTON CORPORATION,
Cross-Appellee.

Appeals from the United States District Court
for the Northern District of Iowa

VOLUME I
Pages 1-208

COMPLAINT

(Filed December 9, 1954)

Now comes the plaintiff, Briggs & Stratton Corporation, and for its cause of action against the defendant, Clinton Machine Co., Inc., alleges as follows:

I.

Briggs & Stratton Corporation is a corporation duly organized and existing under the laws of the State of Delaware and having its principal office and place of business in the City of Milwaukee, Wisconsin.

II.

Clinton Machine Co., Inc., is a corporation duly organized and existing under the laws of the State of Michigan and having an office and place of business in the City of Maquoketa, Iowa, within this District and Division.

III.

The jurisdiction of this court is based upon the patent laws of the United States and particularly Title 35 U.S.C., Sections 271 and 281, and upon Title 28 U.S.C., Sections 1338, 1391 and 1400.

IV.

(a) On August 5, 1952 United States Letters Patent, No. 2,605,753, were duly and legally issued to Dorothy H. Madlé as the administratrix of Alain Madlé, deceased, for "Current Generating Device."

(b) On November 9, 1954 United States Letters Patent, No. 2,693,789, were duly and legally issued to Leo J. Lechtenberg for "Air-Cooled Internal-Combustion Engine."

* * *

(d) The entire right, title and interest in and to the aforesaid Letters Patent, Nos. 2,605,753 [and] 2,693,789 * * * and each of them, have been vested in the plaintiff Briggs & Stratton Corporation by instruments in writing duly recorded in the United States Patent Office.

V.

Since the issuance of the aforesaid Letters Patent, the defendant has been infringing the same, and each of them, by manufacturing and selling within this District and Division, and elsewhere in the United States, internal combustion engines embodying the inventions of said Letters Patent, and each of them; and defendant is now infringing the same and threatens to continue to infringe the same by making, using and selling such internal combustion engines, and defendant will continue to so infringe unless enjoined by this Court. Defendant has slavishly copied the inventions of the Letters Patent in suit, and each of them, as the same are embodied in engines manufactured by the plaintiff.

VI.

Defendant has been given notice by letter of its infringement of each of said Letters Patent.

VII.

Defendant has realized substantial profits from its infringement of said Letters Patent in suit, and each of them, which profits would otherwise have accrued to the plaintiff, and defendant's continued infringement of the Letters Patent in suit, and each of them, will result in further irreparable loss and damage to the plaintiff unless the defendant is enjoined by this Court.

Wherefore, plaintiff prays for:

An injunction perpetually restraining defendant, its agents and employees and those acting in concert with it, from further infringement of the aforesaid Letters Patent, and each of them;

A judgment for an accounting and an award of profits and damages to the plaintiff, as provided by law, and for recovery of costs and reasonable attorneys fees;

And for such other and further relief as the Court may deem meet and just.

Briggs & Stratton Corporation

By /s/ E. Marshall Thomas

O'Connor, Thomas, McDermott & Wright
609 Bank & Insurance Building
Dubuque, Iowa
Attorney for Plaintiff

Of Counsel:
/s/ Ira Milton Jones

110 East Wisconsin Ave.
Milwaukee 2, Wisconsin

December 9, 1954

ANSWER AND COUNTERCLAIM

(Filed January 14, 1955)

Comes now the Defendant, Clinton Machine Co., Inc., and as an Answer to the allegations in the Complaint set forth states:

1st Defense

That the Complaint fails to state any factual cause of action against this Defendant on which relief could be granted to the Plaintiff.

2nd Defense

This Defendant admits the allegations of Paragraphs 1, 2 and 3.

3rd Defense

Answering Paragraph 4, section:

(a) This Defendant admits that Letters Patent No. 2,605,753 were issued on August 5, 1952, to Dorothy H. Madle, as Administratrix of Alain Madle, deceased, but denies that said patent was duly and legally issued.

(b) This Defendant admits that on November 9, 1954, U.S. Letters Patent No. 2,693,789, were issued to Leo J. Lechtenberg, but denies that the said Letters Patent were duly and legally issued.

* * *

(d) Answering section (d), this Defendant states that it has no knowledge on which to base its belief as to whether or not the patents referred to in said section are vested in the Plaintiff herein by instruments in writing duly recorded in the U.S. Patent Office and, therefore, neither admits nor denies the same, but leaves the Plaintiff to its proof.

4th Defense

Defendant denies the allegations of Paragraph 5 and Paragraph 7 of the Complaint, and admits the allegations of Paragraph 8.

5th Defense

This Defendant avers that the claims of Patent No. 2,605,753 [and] Patent No. 2,693,789, * * * which Patents are set forth in the Complaint, are each and all of them invalid and void, because the invention set out in said Letters Patents was patented or described in certain printed publications prior to the patentees' alleged invention thereof, or more than one year prior to patentees' applications for said Letters Patents on which said Letters Patents issued; and because in view of the prior art, prior to the date of the patentees' alleged invention of the subject matter of the said applications, that said patents set out in said Bill of Complaint, and each of them, have required no invention to produce the said alleged improvement set out in any of said Letters Patents; and because said alleged improvement covered by each and all of the claims of said Letters Patents, and each of them, at the date of the respective patentee's invention thereof, was not a patentable invention or improvement, within the meaning of the law, and not proper subject matter for Letters Patent of the United States; and because the respective patentees named in said Letters Patents was not the original and the first inventor or discoverer of the invention purported to be covered thereby.

6th Defense

This Defendant avers that the claims of Patent No. 2,- each and all of the claims of each of the said Letters Patents are invalid in view of Letters Patents which are

set out in Exhibit A which is attached hereto and made a part hereof, and in view of diverse and numerous other patents of the United States and foreign countries, of which this Defandant is not at this time fully informed and which this Defendant begs leave to more fully and completely identify upon this Defendant becoming more fully informed of the same.

7th Defense

This Defendant avers, upon information and belief, that each of the claims of each of the patents referred to in the Bill of Complaint, is invalid, null and void, because the subject matter of said claims was well known and was described in printed publications in the United States and foreign countries more than one year prior to the filing of the applications on which said patents issued, and particularly in advertising sheets and catalogue sheets issued by this Defendant; and in other publications, the nature and identity of such other publications not being at this time known to this Defendant, and this Defendant prays leave to further identify them upon obtaining more information as to the identity of the same.

8th Defense

This Defendant avers that all and each of the claims of each of the said Letters Patents are invalid, null and void, because the subject-matter of said claims was, prior to the alleged invention and the applications filed by the respective patentees, more than one year prior to the filing of the applications on which said patents issued, known to and used by others within the United States, and particularly by this Defendant, and that prior to the alleged patentees' alleged invention of the subject

matter of the respective patents and more than one year prior to the filing of the respective applications on which each of said patents issued, the subject matter of said patents, and each of them, had been manufactured and sold throughout the United States by this Defendant, and by others, and the identity of said others is not fully known to this Defendant at this time, and this Defendant prays leave to further identify the same upon becoming more fully informed as to the identity of such others.

9th Defense

This Defendant avers that each and all of the claims of each of said patents set out in the Complaint are invalid, null and void, because said claims, and each of them, are ambiguous, indefinite, and expressed in uncertain terms, and do not particularly point out and definitely claim any part of the structure disclosed and described in the specifications of said patents.

10th Defense

That all of the claims of each of said patents set out in the Complaint have been so narrowed and restricted by amendments in the prosecution of the application as to narrow and restrict the same so that none of any of said patents could cover or be infringed by articles manufactured or sold by this Defendant, and the Plaintiff is estopped to assert such interpretation of said claims.

11th Defense

That the claims of each of said patents set out are invalid, null and void, as the claims of each of said patents attempt to define subject matter which is not disclosed in the patent.

12th Defense

That all of the claims of each of the patents referred to in the Complaint are invalid in that they do not properly define the alleged invention set out in the respective patent, and because they are too broadly indefinite and functional at the precise point of invention and novelty.

13th Defense

That the subject matter of the U.S. Letters Patent No. 2,693,789 * * *, set out in the Complaint and covered by the claims thereof, was in public use and on sale for more than one year prior to the filing of said applications, and that the patentee of said Letters Patents and his attorneys and agents, and the assignee of said Letters Patents, knew of such subject matter being in public use and on sale in the United States for over a year, but concealed such fact from the officials of the United States Patent Office, and as a consequence thereof, said Letters Patents were fraudulently and deceitfully obtained.

* * *

15th Defense

That the application for Letters Patent No. 2,605,753, which was filed by Dorothy H. Madle, as Administratrix of the Estate of Alain Madle, deceased, as a continuation of an application previously filed by Alain Madle, and abandoned, discloses and covers subject matter which was not the invention of the said Alain Madle, and which was not embraced by or disclosed in or covered by the patent applications previously filed by said Alain Madle, and that at the time of the filing of the application on which Patent No. 2,605,753, issued to this Plaintiff, its agents and attorneys knew that such application con-

tained other subject matter than the invention of the said Alain Madle, and particularly as disclosed and set forth in the applications previously filed by the said Alain Madle, and that with fraudulent intent and purpose concealed such fact from Dorothy H. Madle, Administratrix, and while so concealing such fact had the said Dorothy H. Madle sign the application and swear to the statutory Oath forming a part of the application and thus perpetrating upon the officials of the United States Patent Office fraud and deceit and thereupon had said Letters Patent No. 2,605,753, surreptitiously issued; and that in view of such fraudulent conduct, said Letters Patent No. 2,605,753, and each and all of the claims thereof, is invalid, null and void.

16th Defense

That the specifications and claims of each of said patents set out in said Complaint are calculated to deceive and mislead the public because of ambiguity and needless multiplication of nebulous claims, and said patents are, therefore, null and void.

Wherefore, this Defendant prays that the Complaint be dismissed with costs and attorney's fees to this Defendant, and such other relief as in equity this Defendant may be entitled to.

COUNTER-CLAIM FOR DECLARATORY JUDGMENT

This Defendant, Clinton Machine Co., Inc., as a separate and distinctive defense, and by way of counterclaim in subject matters arising out of the transaction, which is the subject matter of this suit, and which might

be the subjects of suits in equity against the Plaintiff, this Defendant avers:

1.

This Defendant is engaged in the manufacture and sale of internal combustion engines and associated parts thereof, and has been so engaged for several years prior to the beginning of this suit, and has established a nation-wide selling organization, selling through dealers and to manufacturers of original equipment on which this Defendant's product may be used.

2.

That an actual controversy exists between this Defendant and the Plaintiff in that the Plaintiff has charged this Defendant with infringement of certain U.S. Letters Patents alleged to be owned by the Plaintiff and set out in the Complaint therein, to wit:

Patent No. 2,605,753	August 5, 1952
Patent No. 2,693,789	Nov. 9, 1954

* * *

3.

That the products manufactured and sold by this Defendant do not embrace and incorporate or embody the alleged invention of any of the patents of the Plaintiff, or any part thereof, specifically of the above mentioned patents, and therefore do not infringe the same, either per se or in their intended use.

4.

That the aforesaid patents alleged to be owned by the Plaintiff, and each of the said patents hereinabove identified, are invalid in law on many grounds, including the grounds set out in the Answer hereinabove set forth, and including anticipation, and want of patentable invention and particularly in view of the prior patents set out in Exhibit A hereto attached and made a part of the Answer and which is hereby made a part of this counter-claim.

5.

That all of the claims of each of said Letters Patents are invalid and null and void in that they do not properly define an invention because they are too broad functionally at the precise point of asserted novelty, and that each of the claims of each of the said patents is invalid for the reasons set forth in the Answer hereinabove stated, which reasons are incorporated herein and made a part of this counter-claim.

Wherefore, this Defendant prays that this Court enter the Declaratory Judgment, adjudging, determining, and declaring that the alleged patents of the Plaintiff hereinabove identified, and each of them, and each of the claims of each of them, are, and is, invalid, and that the products manufactured and sold by this Defendant, and the use thereof, by the purchaser thereof, does not infringe any of the patent rights of the Plaintiff in any of the patents hereinabove identified and set out in the Complaint, that the Complaint be dismissed, that this Defendant be allowed costs and attorney fees, and

that this Defendant have such further, other, different and general relief as it may be entitled to.

January 6, 1955 THOS. S. DONNELLY
Attorney and Solicitor for the Defendant: Clinton Machine Co., Inc., Clinton, Michigan
3437 Book Building
Detroit 26, Michigan

Of Counsel for Defendant:

January 11, 1955 Kenline, Roedell, Hoffman & Reynolds
Bank and Insurance Building
Dubuque, Iowa

Of Counsel for Defendant:

January 11, 1955 Edward M. Apple
3308 David Stott Bldg.,
Detroit, Michigan

EXHIBIT "A"

United States Letters Patent No.	*Patentee*	*Date issued*
1,242,985	Sawtelle	Oct. 16, 1917
1,447,245	Gore	March 6, 1923
1,463,958	Kettering	Aug. 7, 1923
1,764,147	Burtnett	Aug. 7, 1930
1,921,175	Towler	Aug. 8, 1933
2,060,979	Dienner	Nov. 17, 1936
2,157,666	Jacobi	May 9, 1939
2,170,099	Stubbings	Aug. 22, 1939
2,290,202	Nelson	July 21, 1942
2,334,185	Fisk	Nov. 16, 1943
2,357,942	Farr	Sept. 12, 1944
2,404,833	Forster	July 30, 1946
2,259,079	Leja	July 3, 1951
2,583,466	Brownlee	Jan. 22, 1952
2,590,134	Slonneger	March 25, 1952
2,606,541	Lutz	Aug. 12, 1952
2,627,940	Bakke	Feb. 10, 1953
2,630,881	Bosma	March 10, 1953
2,669,322	Brown	Feb. 16, 1954
1,529,188	Kettering	March 10, 1925
1,683,039	Jack	Sept. 4, 1928
1,685,841	Farmer	Oct. 2, 1928
1,751,443	Cochrane	March 18, 1930
1,947,192	Edwards	Feb. 13, 1934
2,029,216	Barker	Jan. 28, 1936
2,056,755	Welch	Oct. 6, 1936
2,187,265	Carlson	Jan. 16, 1940
2,250,200	Lowther	July 22, 1941
2,305,186	Muenk	Dec. 15, 1942

United States Letters Patent No.	*Patentee*	*Date issued*
2,359,485	Lowther	Oct. 3, 1944
2,361,061	Roos	Oct. 24, 1944
2,607,332	Bosma	Aug. 19, 1952
2,660,987	Doughty	Dec. 1, 1953
1,281,204	Pitts	Oct. 8, 1918
1,611,826	Fischer-Hinnen	Dec. 21, 1926
1,792,089	Hardman	Feb. 10, 1931
1,983,072	Davis	Dec. 4, 1934
2,388,994	Phelon	Nov. 13, 1945

Foreign Patents

Netherlands Patent No. 32,802 — Dated May 15, 1934, To Bilthovenshe.

REPLY TO COUNTERCLAIM

(Filed January 26, 1955)

For its reply to the counterclaim, plaintiff Briggs & Stratton Corporation alleges as follows:

I.

Plaintiff admits that defendant is engaged in the manufacture and sale of internal combustion engines and parts thereof and has been so engaged for several years. Plaintiff is without knowledge as to the nature or scope of defendant's selling organization and leaves defendant to its proofs of the allegations concerning the same.

II.

Plaintiff admits the allegation of paragraph 2 of the counterclaim.

III.

Plaintiff denies each and every allegation of paragraph 3 of the counterclaim and alleges that products manufactured and sold by the defendant infringe each of the patents in suit.

IV.

Plaintiff denies each and every allegation of paragraph 4 of the counterclaim.

V.

Plaintiff denies each and every allegation of paragraph 5 of the counterclaim.

Wherefore, Plaintiff prays that the counterclaim be dismissed and judgment be awarded to the plaintiff in accordance with the prayer of the complaint.

Briggs & Stratton Corporation

By E. Marshall Thomas

609 Bank & Insurance Building
Dubuque, Iowa

Of Counsel:

Ira Milton Jones
110 East Wisconsin Ave.
Milwaukee 2, Wisconsin

January 17, 1955

APPLICATION OF PRIOR ART CITED

(Filed March 4, 1955)

Of the prior art cited, those patents which relate to Patent No. 2,693,789, are as follows:

U.S. No. 1,242,985	Sawtelle	Oct. 16, 1917
U.S. No. 1,447,245	Gore	Mar. 6, 1923
U.S. No. 1,463,958	Kettering	Aug. 7, 1923
U.S. No. 1,764,147	Burtnett	June 17, 1930
U.S. No. 1,921,175	Towler	Aug. 8, 1933
U.S. No. 2,060,979	Dienner	Nov. 17, 1936
U.S. No. 2,157,666	Jacobi	May 9, 1939
U.S. No. 2,170,099	Stubbings	Aug. 22, 1939
U.S. No. 2,290,202	Nelson	July 21, 1942
U.S. No. 2,334,185	Fisk	Nov. 16, 1943
U.S. No. 2,357,942	Farr	Sept. 12, 1944
U.S. No. 2,404,833	Forster	July 30, 1946
U.S. No. 2,559,079	Leja	July 3, 1951
U.S. No. 2,583,466	Brownlee	Jan. 22, 1952
U.S. No. 2,590,134	Slonneger	Mar. 25, 1952
U.S. No. 2,606,541	Lutz	Aug. 12, 1952
U.S. No. 2,627,940	Bakke	Feb. 10, 1953
U.S. No. 2,630,881	Bosma	Mar. 10, 1953
U.S. No. 2,669,322	Brown	Feb. 16, 1954

Foreign Patent:

No. 32,802	Netherlands	May 15, 1934

* * *

Of the prior art cited, the patents which are applicable to Patent No. 2,605,753 are as follows:

U.S. No. 1,281,204	Pitts	Oct. 8, 1918
U.S. No. 1,611,826	Fischer-Hinnen	Dec. 21, 1926
U.S. No. 1,792,089	Hardman	Feb. 10, 1931
U.S. No. 1,983,072	Davis	Dec. 4, 1934
U.S. No. 2,388,994	Phelon	Nov. 13, 1945

Thos. S. Donnelly
Attorney for the Defendant
3437 Book Building
Detroit 26 Michigan

Of Counsel:

Kenline, Roedell, Hoffman & Reynolds
Bank & Insurance Building
Dubuque, Iowa

February 16, 1955

NOTICE OF PRIOR PUBLIC USE AND ADDITIONAL PRIOR ART

(Filed March 4, 1955)

Notice is hereby given by the Defendant in the above entitled case of prior art in addition to that set out in Exhibit "A" of Defendant's Answer which may be used by the Defendant in this case.

The additional prior art applicable to the patent to Lechtenberg, No. 2,693,789, is a follows:

U.S. 1,276,891	Felix	August 27, 1918

The prior art in addition to that set out in Defendant's Exhibit "A" which is applicable to the patent issued to Madle, No. 2,605,753, is as follows:

U.S. 663,643	Simms et al.	Dec. 11, 1900
U.S. 780,221	Packard	Jan. 17, 1905
U.S. 810,963	Motsinger	Jan. 30, 1906
U.S. 816,083	Farwell	Mar. 27, 1906
U.S. 847,876	Apple	Mar. 19, 1907
U.S. 857,715	Brillie	June 25, 1907
U.S. 863,151	Churchill	Aug. 13, 1907
U.S. 1,091,906	Zahringer	Mar. 31, 1914
U.S. 1,224,247	Wacker	May 1, 1917
U.S. 1,261,079	Warren	April 2, 1918
U.S. 1,280,102	Dutreux	Sep. 24, 1918
U.S. 1,401,058	Erickson	Dec. 20, 1921
U.S. 1,427,718	Brown	Aug. 29, 1922
U.S. 1,674,176	Newton	June 19, 1928

PRIOR PUBLICATIONS

The prior publications upon which the Defendant relies and which are referred to in the 7th Defense of Defendant's Answer are catalog sheets and advertising literature circulated to the trade by this Defendant, Clinton Machine Co., Inc.

The prior publications referred to are applicable to Patent 2,693,789 * * * which issued to L. J. Lechtenberg.

PRIOR KNOWLEDGE, USE AND SALE

The prior knowledge, use and sale referred to in the 8th Defense of Defendant's Answer consists of prior knowledge and sale by the following:

The Defendant, Clinton Machine Co., Inc., Clinton, Michigan

Pincore Manufacturing Co., 5841 West Dickens, Chicago, Illinois

Lawson Engine Company, New Holstein, Wisconsin

The Plaintiff, Briggs & Stratton Corporation, Milwaukee, Wisconsin

Cauffiel Motor Industries, Temperance, Michigan

Doehler-Jarvis Corporation, Toledo, Ohio

The prior public knowledge, use and sale referred to relate to Patent No. 2,693,789 * * * .

February 23, 1955

Thos. S. Donnelly,
Attorney for the Defendant
3437 Book Building,
Detroit 26, Michigan

Of Counsel:
Kenline, Roedell, Hoffman & Reynolds
Bank & Insurance Building
Dubuque, Iowa

NOTICE OF PRIOR PUBLIC USE AND SALE

(Filed March 18, 1955)

Notice is hereby given by the Defendant in the above entitled case of prior public use and sale in addition to that heretofore noticed.

The prior knowledge, use and sale referred to in the 8th Defense of Defendant's Answer consists of prior knowledge, use and sale of the structures defined in the three patents in the Complaint, said prior knowledge, use and sale being by the following:

George Rose, Jr.
53 Sand Lake
Onsted, Michigan

Arthur Eaton
R.R. 2
Tecumseh, Michigan

Ned Baldwin
Baldwin Hardware Company
Tecumseh, Michigan

In addition to the prior art heretofore noticed, notice is hereby given of additional prior art to be used by the Defendant against all of the patents in the Complaint, namely:

Van Sickle	615,766	1898

March 15, 1955

Thos. S. Donnelly,
Attorney for the Defendant
3437 Book Building
Detroit 26, Michigan

Of Counsel:

Kenline, Roedell, Hoffman & Reynolds
Bank & Insurance Building
Dubuque, Iowa

NOTICE OF ADDITIONAL PRIOR ART

(Filed April 12, 1955)

Notice is hereby given by the defendant in the above entitled case of prior art in addition to that previously noticed to the plaintiff which may be used by the defendant in this case.

The additional prior art herein referred to is applicable to the patent issued to Madle, No. 260,575, and is as follows:

Sturtevant	740,781	Oct. 6, 1903
Cochran	798,992	Sept. 5, 1905
Callan	809,771	Jan. 9, 1906
Keating	822,525	June 6, 1906
Riker	906,290	Dec. 8, 1908
Heaslet	1,239,689	Sept. 11, 1917
Kettering	1,265,454	May 7, 1918
Smith	1,291,216	Jan. 14, 1919
Kettering	1,430,524	Sept. 26, 1922
Kettering	1,463,958	Aug. 7, 1923
Kettering	1,465,644	Aug. 21, 1923
Smith	1,636,017	July 19, 1927
Littlefield	2,013,541	Sept. 3, 1935
Lefebvre	2,215,106	Sept. 17, 1940
Bosma	2,346,148	April 11, 1944

English Patent No. 310,082 Appln. Date Jan. 20, 1928, Filing Date: Oct. 20, 1928: Acceptance Date April 22, 1929.

The Bosma Patent is applicable to the Lechtenberg Patent No. 2,693,789.

Dated:

THOS. S. DONNELLY
Attorney for Defendant
3437 Book Bldg., Detroit 26 Mich.

Of Counsel:
Kenline, Roedell, Hoffman & Reynolds
Bank & Insurance Bldg.
Dubuque, Iowa

Page of Transcript

TRANSCRIPT OF TRIAL PROCEEDINGS

April 18-22, 1955

HUGH S. BROWN

Direct Examination

My name is Hugh S. Brown, 58 years old, my address is 2020 Two-Tree Lane, Wauwatosa, Wisconsin. I am vice president in charge of engineering of the Briggs & Stratton Corporation at Milwaukee, Wisconsin.

When I came to Briggs & Stratton in 1941 it was as a Director of Engineering. I became Vice President in Charge of Engineering in 1944, and became a director of the company in 1948.

I was on gasoline engines before the first World War, with the French Government, on the Hispano Souiza engines. I was in the Navy functioning on engines — working with engines, during the War. I am a graduate of Pratt Institute in Brooklyn, New York in Mechanical Engineering. I was with the Buda Company for seventeen years, and when I left there I was Chief Engineer of the Railway Division of that Company. And during that time I had to do with gasoline engines as well as railway equipment and other material.

From Buda I went to the Briggs & Stratton Corporation. Briggs & Stratton have been making internal combustion engines since I have been there and, from records I have seen in the Engineering Department, since 1919.

Briggs & Stratton have concentrated on single cylinder four-cycle air-cooled gasoline engines. They were manufacturing vertical cylinder horizontal crankshaft engines in about 1950. Such an engine is engine Exhibit 9. The only difference between that engine and those they were building in 1950 is that the blower housing and gas tank were different. There has been a facelifting job since

1950. The internal parts of the engine are practically identical. The facelifting job is Exhibit No. 9. That facelifting job came on the market I think in 1952. In other words Exhibit No. 9 represents the 1952 version of the Briggs & Stratton Engine. That has a vertical cylinder and horizontal crankshaft.

Briggs & Stratton were manufacturing a horizontal cylinder vertical crankshaft engine at the same time it was manufacturing the engine Exhibit 9 and its predecessor. The engine that they were building is a 6AH Model. That is Exhibit 10. There were two engines that preceded the engine in Exhibit 10. One of them had a cast iron base instead of the die cast base shown in Exhibit 10. And the other engine had a circular base that was practically under the cylinder and crankshaft of the other—on the 6HF engine. Engines like Exhibit 10 were used for the most part on rotary lawn mowers. Its weight is approximately thirty-six pounds.

44 The engine which has been marked Plaintiff's Exhibit 12 is Briggs & Stratton Model 6BH Engine. The 6BH, Exhibit 12, has succeeded the 6AH, Exhibit 10.

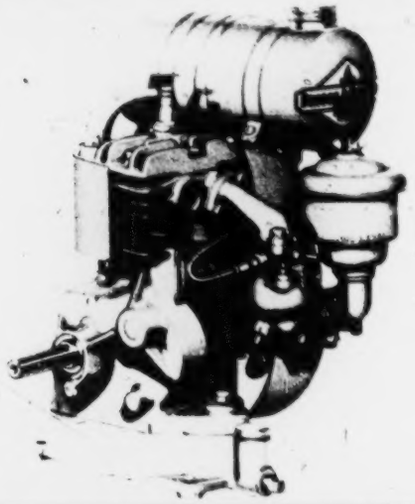
There was a great deal of work done to develop the 6BH Engine, Exhibit 12.

The engine which was used on the preliminary tests was as shown in the upper left panel of Chart No. 5, Exhibit No. 8. This engine is a cast iron engine and was known as a Briggs & Stratton Model N. There was also an engine that had a different mounting, that was called an NP. And in many of these tests either an N
45 or NP engine were used. The only difference between the two, one had a four-hole bottom mounting and the

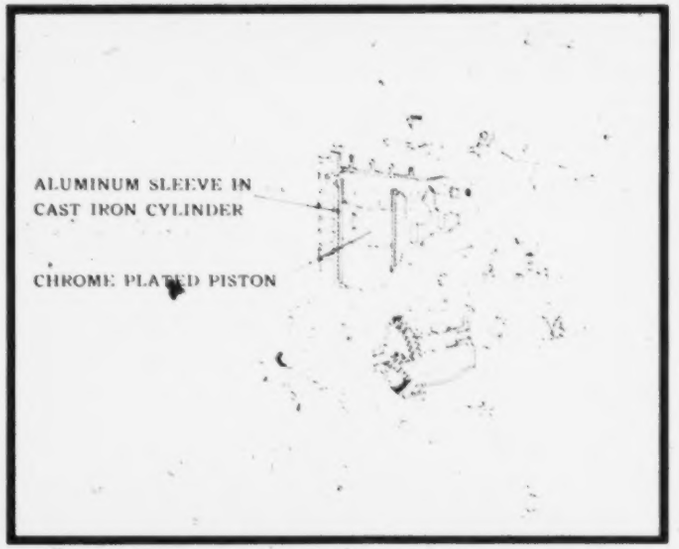
CHART NO. 5

SOME OF PRELIMINARY TESTING STEPS REFERRED TO IN BROWN AFFIDAVIT SUPPORTING PETITION TO MAKE SPECIAL

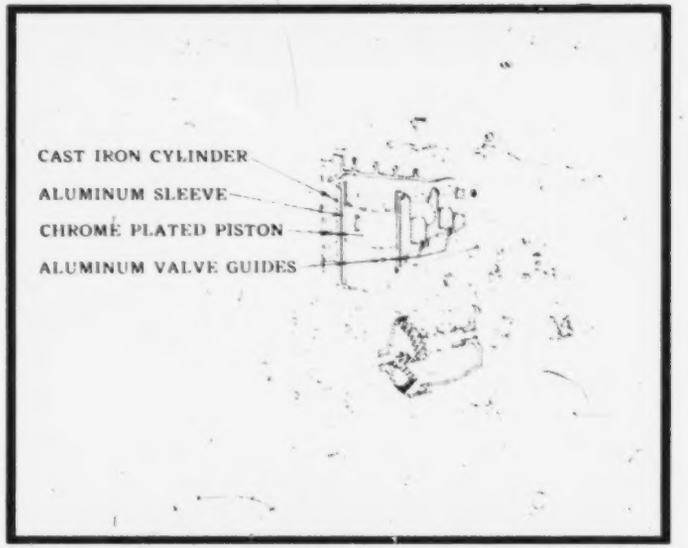
MODEL "N" TYPE ENGINE USED FOR TESTS



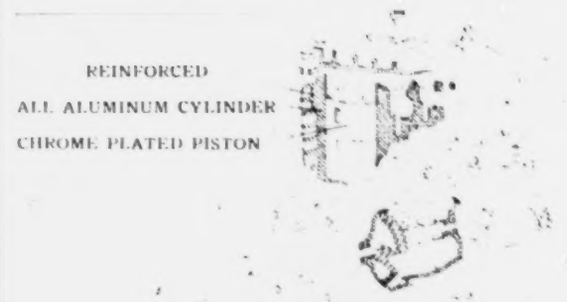
FIRST TEST ENGINE – AUG. 4, 1950



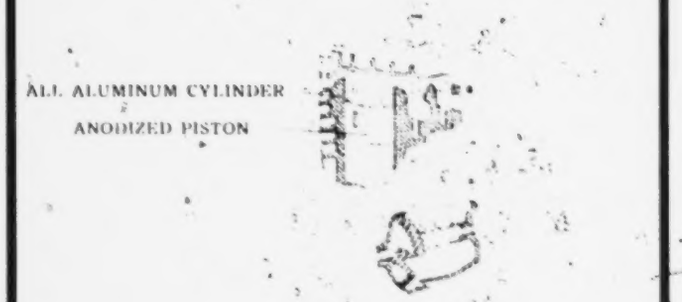
SECOND TEST ENGINE – SEPT. 19, 1950



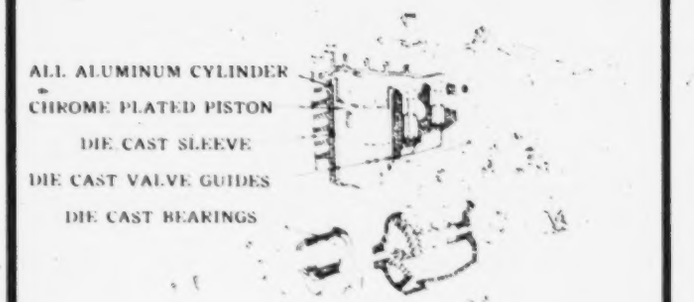
FOURTH TEST ENGINE – OCT. 23, 1950



FIFTH TEST ENGINE – NOV. 30, 1950



TWELFTH TEST ENGINE – DEC. 10, 1951



IRA MILTON JONES

Page of Transcript

other a plain bearing. In the upper center panel, described as the first test engine which was assembled and started on test on August 4, 1950. This engine was made up from an engine shown in the upper left panel. This engine had an aluminum sleeve in a cast iron cylinder and used an aluminum piston that was chrome plated. The second test engine, which was assembled on September 19, 1950, is shown in the upper right panel. This engine is also—Exhibit 11. That is the engine with the parts removed so that you can see the changes that were made in it. This engine had an aluminum sleeve and chrome plated aluminum piston and also had aluminum valve guides. Shown in the upper right hand corner of the chart, Plaintiff's Exhibit No. 8.

The fourth test engine is shown in the lower left panel of Chart No. 5 and this engine is made entirely of aluminum. This engine was made from the sand cast molds
46 that were used to make the cast iron engine, only aluminum was poured in the mold rather than cast iron; and that was done in the Briggs & Stratton plant. This engine has an all aluminum cylinder and a chrome plated piston. The piston was made of aluminum. The fifth test engine is shown in the lower middle panel. It also has an all aluminum cylinder but uses an anodized aluminum piston.

The Court: What is that anodized?

A. That is a treatment of the aluminum, Your Honor, a hardening of the surface. It is aluminum and an oxide.

The twelfth test engine is shown in the lower right hand panel; and it was assembled on December 10, 1951. This engine had an all aluminum cylinder and chrome plated aluminum piston, but was equipped with

Page of Transcript

a die cast aluminum sleeve, die cast valve guides and die cast main bearings. Now, the reason why the twelfth test engine was so equipped—we wanted to be sure that the action of die cast aluminum parts would be the same as the sand cast aluminum parts previously used. Even
47 though they were of the same analysis we might have found a difference in the structure, and the twelfth test engine was run to prove these points. Now, all of the engines shown on the chart, Exhibit No. 8, Chart No. 5, with the exception of the fifth test engine performed very well, and indicated that we could make an aluminum die cast engine with no liner in the engine, and it would operate with a chrome plated aluminum piston. The anodized piston did not perform.

Prior to the twelfth test there had been many tests of a general kind. The chart shows the general progress. But there were—might have been several engines of the same make up tested so that we would be sure. But prior to the test starting of the twelfth test engine, layout and other work was done in engineering on the design of the engine known as the 6BH, Exhibit 12, I believe.

The—well, after the twelfth test we knew for sure that we could have an engine that would operate with die cast material. And that test was started on December
48 10, 1951. Back before that test was started the layout of the engine shown in the Lechtenberg Patents had been started. And the layout of that engine was completed on December 5, 1951. Briggs & Stratton does not keep accurate records of all of the jobs in the Engineering Department. But from my best estimate a conservative figure for the cost to Briggs & Stratton of the experimental work that I have been referring to, up to about August 9, 1950, would be $110,000.00.

Page of Transcript

49 After the layout of the engine and the detailed drawings had been made, which I have described before, sand cast engines to these drawings were made, and they were given additional tests in many different fields.

Briggs & Stratton make two engines that incorporate the disclosure of the Lechtenberg patents that are at the present time in production and those two engines are the 6BH as Exhibit 12, and a suction feed model of the
50 same type of engine, which is called the 6LH, suction feed type.

51 These same production drawings were used for the sand castings as were later used for the die castings; and that is always our usual practice. The engines produced from those drawings is the engine illustrated in the drawing of the two Lechtenberg Patents in suit. The Briggs & Stratton Engine, Plaintiff's Exhibit 12, includes the findings of the—shown on the chart, Exhibit 8, with the
52 exception of the fifth test engine, which was not considered. Of course, that was not included.

The present engine embodying the disclosures of the drawings of the Lechtenberg Patent was first introduced to the trade as the BH Engine similar to that shown in Exhibit 12 only made in sand castings. These were first shipped as pre-production samples on January 13, 1952 —on January 17, 1953, I beg your pardon.

I checked the invoices. I believe these first engines, these sand cast engines, were called 6BH to distinguish them from the pre-production samples—they were pre-production samples. They were sent out to our customers so they would have an opportunity to try out the engine on their equipment to see if it performed satisfactorily on their particular equipment.

Page of Transcript

53 The reception these first sand cast engines comparable to Plaintiff's Exhibit 12 engines received in the trade, I would say, was a most enthusiastic one. I personally checked on the trade reaction. It is a most important part of my work to keep abreast with the trade reception of the various Briggs & Stratton engines. And that requires that I go out into the field.

The same drawings were used for the sand castings as were used with die cast engines. The reasons for making
54 the sand cast engines is that it is our normal procedure to use drawings of the die castings and have sand cast castings made in order to check and test before the die cast molds are made. The die cast molds are so very expensive that a slight mistake can be most costly, and we find it—very profitable, let us say, to make them up in sand castings before we made them out of the solid metal. I would say about a thousand pre-production samples of the sand cast model were made and sent out. I mean, the engine the same as Exhibit 12, only in a sand casting.

If a third party wanted to make a similar engine it would be most advantageous to have a Briggs & Stratton die cast engine before him because there are many things to see on a die casting, how the mold is prepared, how it is gaged, and all of that, it would be most advantageous. It would effect a material saving to the persons copying to follow a Briggs & Stratton die cast engine. For
55 instance, I might illustrate that by the fact before we built the steel mold for the engine shown in Exhibit 12, the cylinder for it rather, we made a wooden copy in mahogany so we would get it correctly, and checked it over very carefully before we made it out of steel.

Page of Transcript

The die cast mold for the cylinder of the Model 6BH Engine shown in Exhibit 12 would cost approximately $30,000.00 apiece, and as I know it now, we would have over ten of those molds in addition, to make supporting parts. I think the best way to illustrate the complexity of the mold to make the cylinder is to say there are over 150 detailed drawings on the mold to make the cylinder.

---

56 KENNETH C. AGAR

Direct Examination (Adverse)

57 Kenneth C. Agar, 1057 Martin Place, Ann Arbor, Michigan. Chief Engineer of the Defendant in this
58 action, Clinton Machine Company, Incorporated. I was made Chief Engineer of the Clinton Machine Company, Incorporated on June 4, 1945. I first entered the employ of the Clinton Machine Company practically on June 4, 1945.

* * *

64 Examining the April, 1954, Clinton General Specifications, Plaintiff's Exhibit No. 14, I cannot state whether the two pictures at the top thereof are true representations—reproductions of the Clinton Series VS100 four-cycle engine as it existed April, 1954 because this is an artist's reproduction of the photograph we took. I did not take these pictures myself. I presume they were made from pictures of a Clinton engine. I don't know for certain.

65 Explaining the situation with reference to the making of those cuts, as best I know, we made sample engines of those same engines. We don't make expensive gas tanks, but we build them up on top of those engines. It would be far too much expense to make tanks of that

description in sheet metal, we made them in clay. They were placed upon those engine crankcases and photographs taken.

The illustrations appearing at the top of Plaintiff's Exhibit 14 were made from photographs of an engine having a clay built-up tank structure. The lower structure was made up of either sample parts or wood parts;
66 I believe they were sample parts. Those sample parts were made at Clinton, Michigan, or we had them made at tool shops around Michigan. I supervised their making.

The engines illustrated at the top of Plaintiff's Exhibit 14 are illustrations of engines that were made up under my supervision. That same is true of the illustrations appearing at the top of Plaintiff's Exhibit No. 14c. I couldn't give you the exact dates when we made up the engine that is reproduced at the top of Plaintiff's Exhibit 14 and 14c. I don't remember them. It would be
67 some time prior to the date of Exhibit 14. And also, of course, prior to the date appearing on 14c.

Q. Now, I am showing you a blown up photostat, which is marked Plaintiff's Exhibit 14d, and when I tell you that is a photostat, I personally had made of the cuts appearing at the top of Plaintiff's Exhibit 14, you agree with me, do you not?

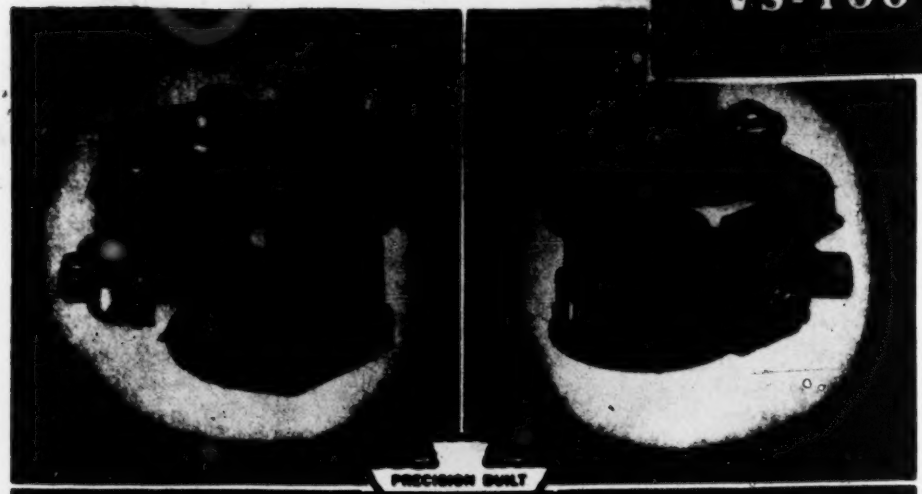
A. Yes.

Q. Examine it carefully, because I don't want there to be any mistake?

A. I would say yes.

We haven't kept records of when the first engine Series VS100 four-cycle engine, corresponding to that reproduced at the top of the Clinton General Specifications, Plaintiff's Exhibit No. 14 and 14c, and of which Plain-

VS-100



PRECISION BUILT CLINTON ENGINE

For complete power curve and dimensional specifications, SEE REVERSE SIDE

	HP	RPM
VS-100	1.45	2200
	2.0	2800
	2.5	3600

GENERAL SPECIFICATIONS

Model	Type	Description	Starter	Weight
VS-100				

BORE
STROKE
TYPE
AIR COOLED
PISTON DISPLACEMENT
IGNITION
SPARK PLUG
LUBRICATION

CARBURETOR
GOVERNOR
MAIN BEARINGS
CRANKSHAFT
CONNECTING ROD
PISTON
PISTON RINGS
VALVES
VALVE SEATS
VALVE TAPPETS

CYLINDER AND CRANKCASE
CYLINDER HEAD
OIL FILLER
AIR CLEANER
FUEL TANK
OIL RESERVOIR
DIRECTION OF ROTATION
FINISH

STANDARD EQUIPMENT

Standard equipment on [illegible]

SPECIAL EQUIPMENT

MANUFACTURED IN A WIDE RANGE OF 2 CYCLE AND 4 CYCLE MODELS

CLINTON ENGINES PROVIDE POWER

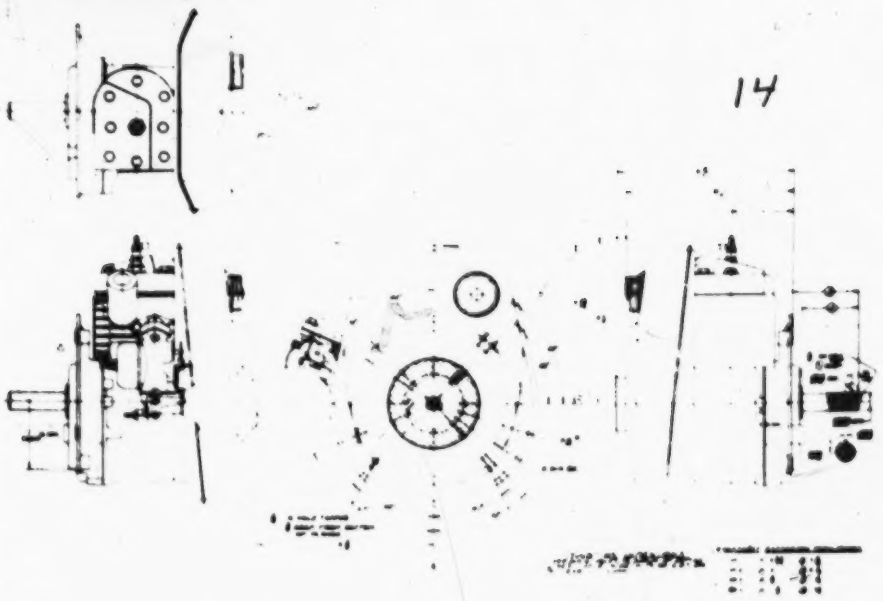
FOR FARM • HOME • INDUSTRIAL EQUIPMENT

FORM 5877 PRINTED IN U.S.A. ISSUED APRIL 1938

[redacted]

Detailed prints and engineering counsel are available. Specifications and Dimensions are subject to change without notice.

14



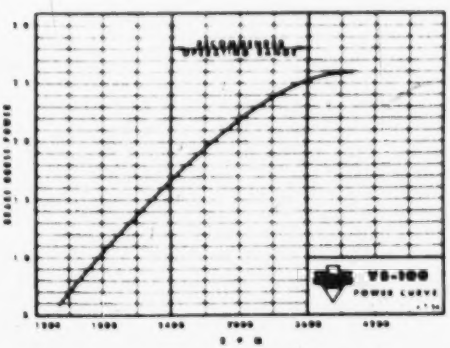
POWER DATA

The performance and power analysis figures for the Clinton Engine series show the rated Brake Horse Power developed from test-run engines. The standard engine equipped with standard air cleaner and muffler was used, in every case, for these tests and the figures have been corrected for barometer at sea level and temperature of 60° F. Production engines when shipped will develop not less than 85% of rated B.H.P.

Production engines, after run-in to reduce friction will develop not less than 95% of the rated B.H.P.

Engine power will decrease 3% for each 1,000 feet above sea level, and 1% for each 10° F. above standard temperature of 60° F.

Unless otherwise specified, governors are set to operate at 3,600 R.P.M. without load. Complete details of installations requiring continuous operation at other than recommended speeds should be referred to the factory for approval.



CABLE ADDRESS: ENGINES U. S. A.

ENGINE DIVISION OF **CLINTON MACHINE CO.**

MAQUOKETA, IOWA

103 PRINTED IN U. S. A.

ON LETTERHEAD OF
CLINTON MACHINE CO.

April 23, 1954

Announcement

Here's the specification sheet you have been waiting for on the CLINTON LIGHT-WEIGHT 4-CYCLE VERTICAL SHAFT ENGINES.

We believe when you go over this specification sheet carefully, it will once again show why Clinton is and has been the leader with vertical shaft engines in the rotary power mower field.

Particularly note the crankcase and cylinder, because it does have the design most people have been talking about and asking for. Also note the H.P. and the overall mounting dimensions (it is interchangeable).

If we can be of service to you, please feel free to call on us.

Yours very truly,

CLINTON MACHINE COMPANY

Clete Erlacher

Sales Manager

CE:bkh

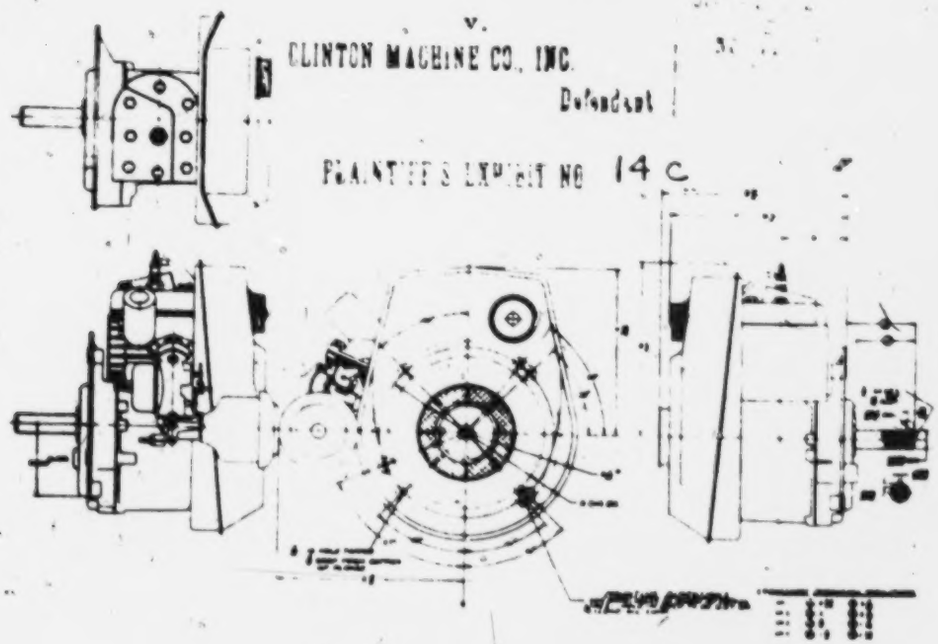
Enclosure

VS-100

DIMENSIONAL SPECIFICATIONS AND POWER DATA

Detailed prints and engineering counsel are available. Specifications and Dimensions are subject to change without notice.

BRIGGS & STRATTON CORPORATION
Plaintiff
v.
CLINTON MACHINE CO., INC.
Defendant
PLAINTIFF'S EXHIBIT NO 14 C



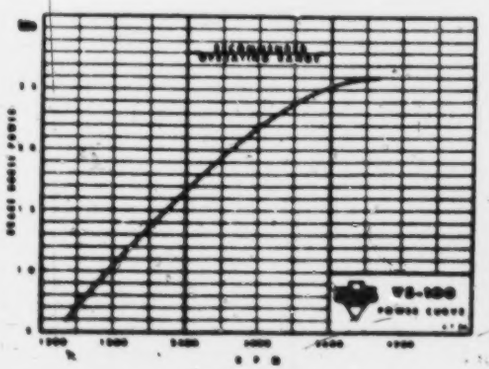
POWER DATA

The performance and power analysis figures for the Clinton Engine series show the rated Brake Horse Power developed from test-run engines. The standard engine equipped with standard air cleaner and muffler was used, in every case, for these tests and the figures have been corrected for barometer at sea level and temperature of 60° F. Production engines when shipped will develop not less than 85% of rated B.H.P.

Production engines, after run-in to reduce friction will develop not less than 95% of the rated B.H.P.

Engine power will decrease 3% for each 1,000 feet above sea level, and 1% for each 10° F. above standard temperature of 60° F.

Unless otherwise specified, governors are set to operate at 3,600 R.P.M. without load. Complete details of installations requiring continuous operation at other than recommended speeds should be referred to the factory for approval.

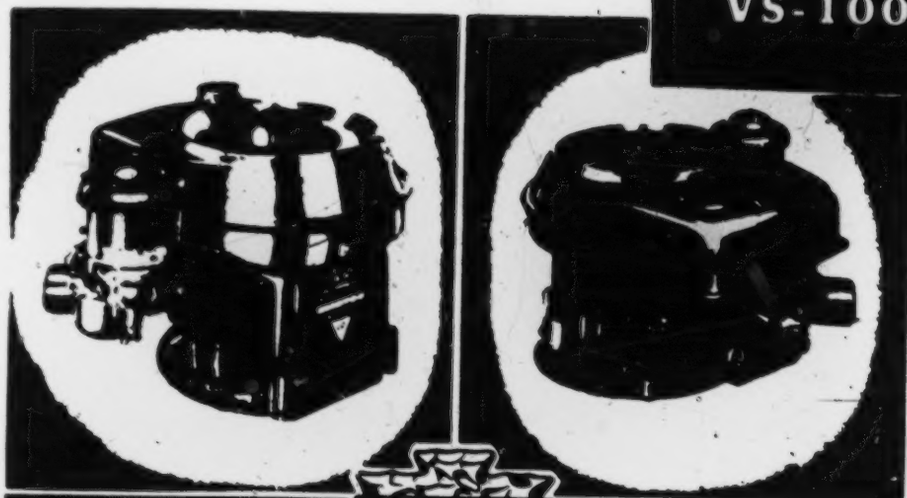


GASOLINE ENGINES U.S.A.

ENGINE DIVISION OF **CLINTON MACHINE CO.**

MUSCATINE, IOWA

PRINTED IN U.S.A.



VS-100

For complete power curve and dimensional specifications, SEE REVERSE SIDE.

	HP	R.P.M.
VS-100	1.45	2200
	2.0	2600
	2.5	3600

GENERAL SPECIFICATIONS

Model	Type	Description	Starter	Weight
VS-100	4-Cycle Air Cooled	Vertical Shaft	Rope or Recoil	19

BORE: 2¾
STROKE: 1¾
TYPE: 4 cycle single cylinder L-Head air-cooled
AIR-COOLED: Large capacity curved vane blower cast integral with fly wheel. Air passes through deep fins to maintain correct operating temperature
PISTON DISPLACEMENT: 7.2 cubic inches
IGNITION: Very high voltage built-in flywheel magneto for faster starting. Moisture and dust proof with fully enclosed ignition points
SPARK PLUG: 14 m m
LUBRICATION: Splash system
CARBURETOR: Fuel float feed with idle and high speed adjustment
GOVERNOR: Adjustable air velocity type
MAIN BEARINGS: Aluminum alloy
CRANKSHAFT: Arma steel induction heat treated. Counterweights and cam gear drive integral with shaft
CONNECTING ROD: I Beam aluminum alloy with extra large bearings
PISTON: Aluminum alloy Clinton-engineered for efficient combustion
PISTON RINGS: Two compression and one oil control. Treated surfaces
VALVES: Forged steel. Exhaust valve provided with heat resistant alloy head
VALVE SEATS: Alloy inserts
VALVE TAPPETS: Hardened and ground
CYLINDER AND CRANKCASE: Die cast cylinder block and crankcase with large amount of cooling area for cool operation. A close-grained cast iron liner is die cast in block
CYLINDER HEAD: Aluminum removable with extra deep cooling fins
OIL FILLER: Conveniently located for easy check of oil level and for filling
AIR CLEANER: Visible oil bath type
FUEL TANK: 1½ quart capacity with gasoline strainer and shut-off
OIL RESERVOIR: One pint capacity
DIRECTION OF ROTATION: Counter clockwise viewed from power take-off shaft side
FINISH: Heat resistant dark green enamel. Other colors available upon request

BRIGGS & STRATTON CORPORATION

STANDARD EQUIPMENT

Standard equipment includes Donaldson oil bath air cleaner dust and moisture-proof, high voltage flywheel magneto, float feed carburetor and heat tube muffler, blower housing, crankshaft machined to accommodate clutch and [illegible] starter, rope starter.

SPECIAL EQUIPMENT

Special equipment includes Remote governor controls any length throttle cables and stop ignition shielding other crankshaft extensions fungus proofing kerosene conversion electric starter

CLINTON [illegible] CO., INC.
No. 7[illegible]
MANUFACTURERS OF 2 CYCLE AND 4 CYCLE ENGINES

CLINTON ENGINES PROVIDE POWER

FOR PUMPS · MIXERS · INDUSTRIAL EQUIPMENT

PRINTED IN U.S.A.

Filed April 22, 1955
PLAINTIFF'S EXHIBIT NO. 14 C

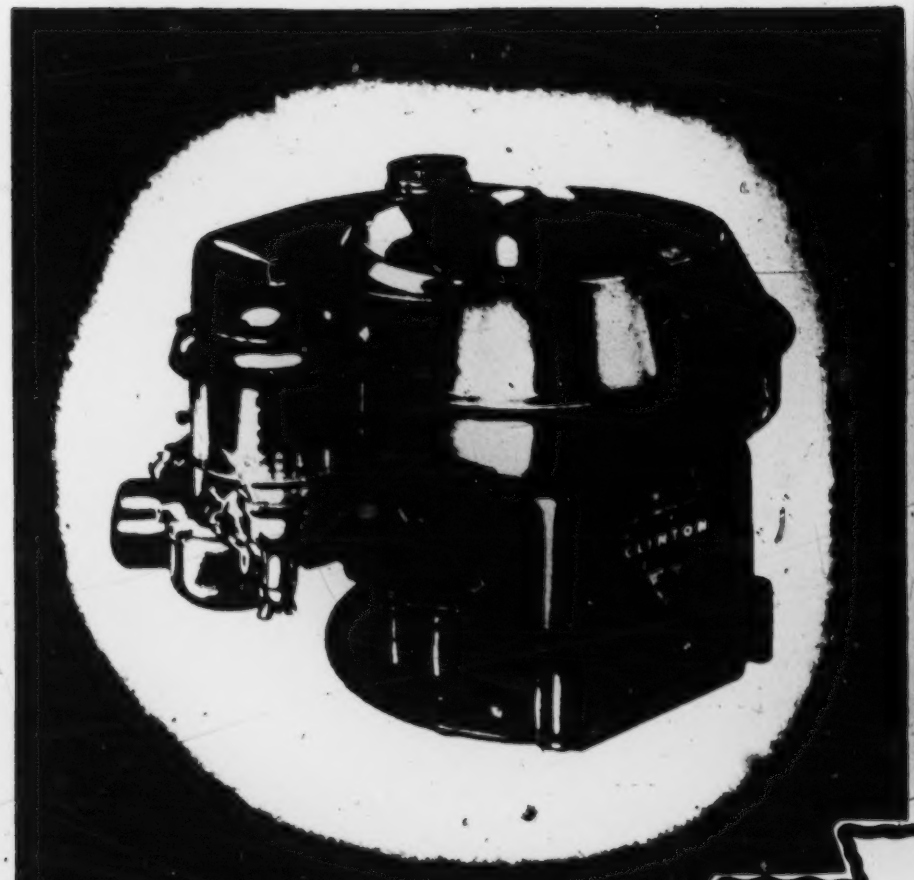
Get Free Engine Check-up! Lee M. Negley, Calif.

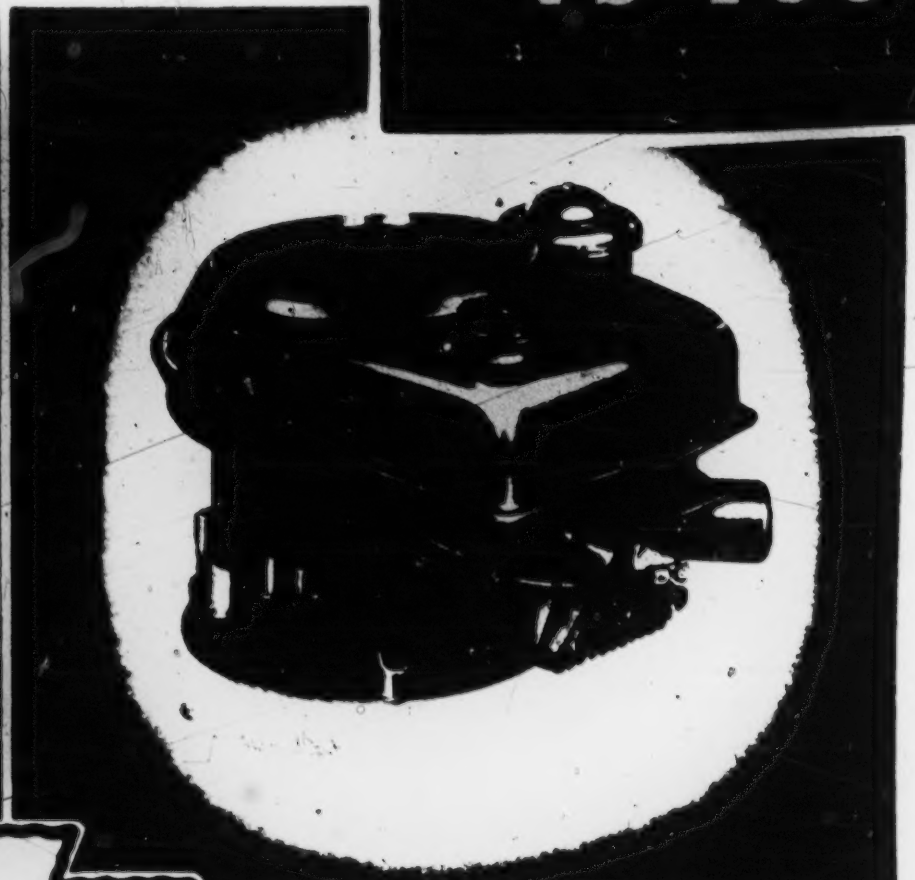
★ CARBURETOR ★ COMPRESSION ★ IGNITION ★

at any Clinton Service Station as listed in your Authorized Clinton Service Directory or consult the Classified Section

PLAINTIFF'S EXHIBIT 146

VS-100





PRECISION BUILT

CLINTON

ENGINE

CLINTON MACHINE CO

A [illegible] Engine Manufactured and Made By

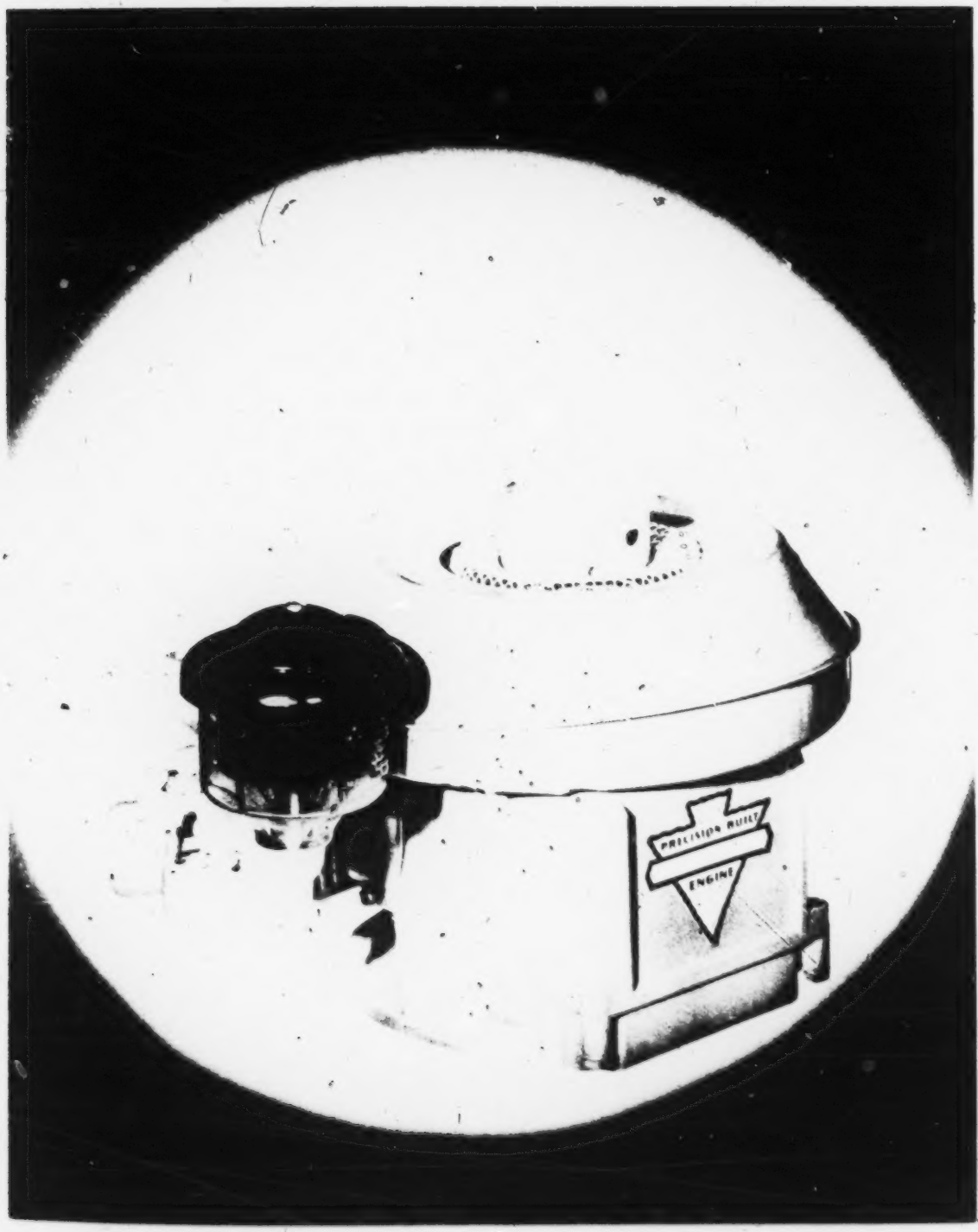
For Farm, Home and Industrial Use

For complete power curve and dimensional specifications, SEE REVERSE SIDE.

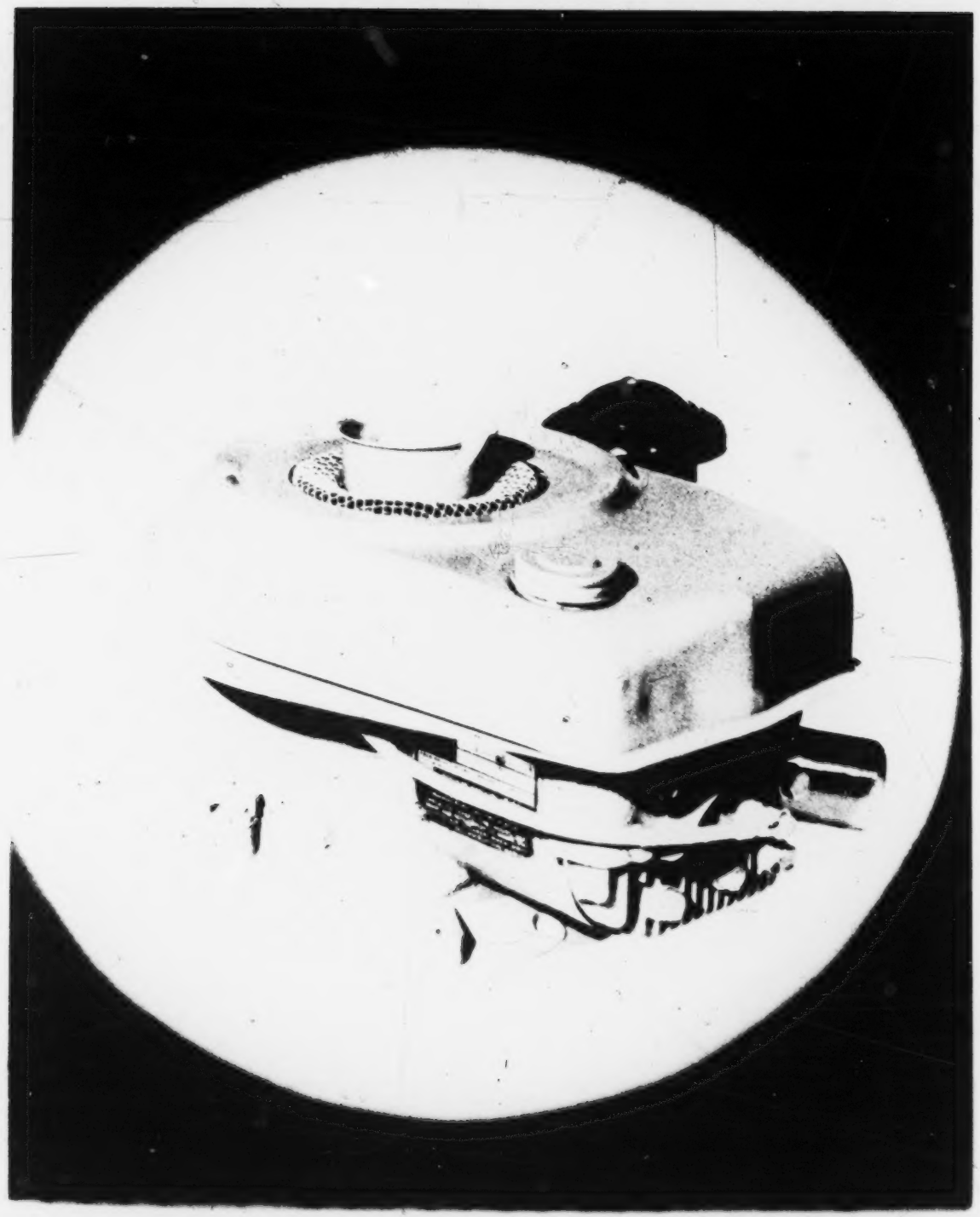
	H.P.	R.P.M.
VS-100	1.45	2200
	2.0	2800
	2.5	3600

GENERAL SPECIFICATIONS

Model	Type	Description	Starter	Weight


PRECISION BUILT
ENGINE

PLAINTIFF'S EXHIBIT 14f



Page of Transcript

tiff's Exhibit 14d is a blow up, was completed. We didn't
68 figure we would use them again, have any need for them. My judgment was around the latter part of May, 1945—or '54, excuse me. It is my belief that prior to August 24, 1954 we had built all of the—oh, 45 of the 50 samples we started by that time. Now, I would have to consult the records to be sure of that. All of this work was done under my supervision and under my control. The engine illustrated at the top there was made under my direct supervision and control. The illustration at the top of General specifications, Plaintiff's Exhibit 14c are illustrations from the same engine appearing at the top of Plaintiff's Exhibit 14.

69 Referring to the photostatic blow-up, Exhibit 14b, which we agree is the same as the illustration on Exhibit 14 and 14c, this photograph marked Plaintiff's Exhibit 14e, is the photograph appearing on the left side of 14d.

The photograph marked 14f is a picture of the engine appearing on the right side of Exhibit 14b.

I wouldn't be sure about where the specific engine is that is reproduced at the top of Clinton General Specifications, 14 and 14c of which the photostat 14d is a blow-up. Parts of it may be around our office or may be scrapped.

70 The accused Clinton engine, the engine in question, is Clinton's best-selling engine.

HUGH S. BROWN (RECALLED)

Direct Examination

71 I can identify these two pictures 14f and 14e. These pictures were taken under my supervision. They show a Briggs & Stratton base and cylinder and crankcase with

Page of Transcript

a Clinton gas tank and other exterior parts. The basic engine is a Briggs & Stratton engine. The engine marked Exhibit No. 4 is the engine of which these photographs 14e and 14f were made from.

The engine in Exhibit 4 was made from a basic Briggs & Stratton engine but a VS100 Clinton Gas Tank and rope starter, pulley and screen and the cylinder shield was put on the regular Briggs & Stratton cylinder. Also, the Clinton breather-cover, air-cleaner and carburetor and intake elbow were used. To change over the Briggs & Stratton cylinder, the outer baffle was cut out.

Exhibit No. 16a of Exhibit 16, to make the cylinder shown on engine in Exhibit 4, this — the flange at the
72 upper left-hand part of the cylinder was removed, just cut off. By cutting off that flange, it would not affect or influence the operation of the engine if another cover with a substitute was taken. That was the only change made in the Briggs & Stratton cylinder to place it on this engine, Exhibit 4. The Clinton name plate appearing on Plaintiff's Exhibit 4 was photographed off of a Clinton engine — from a Clinton engine. And put on to show how the pictures were made in specifications sheet dated in April '54.

73 I am taking this duplicate of Plaintiff's Exhibit 14d which is the blow up of the Clinton illustration which Mr. Agar testified was the Clinton engine, and indicating on that copy, using a red pencil, those peculiar points of likeness between the Briggs & Stratton engine and this alleged Clinton engine, using numbers, but describing the part that I apply the number to.

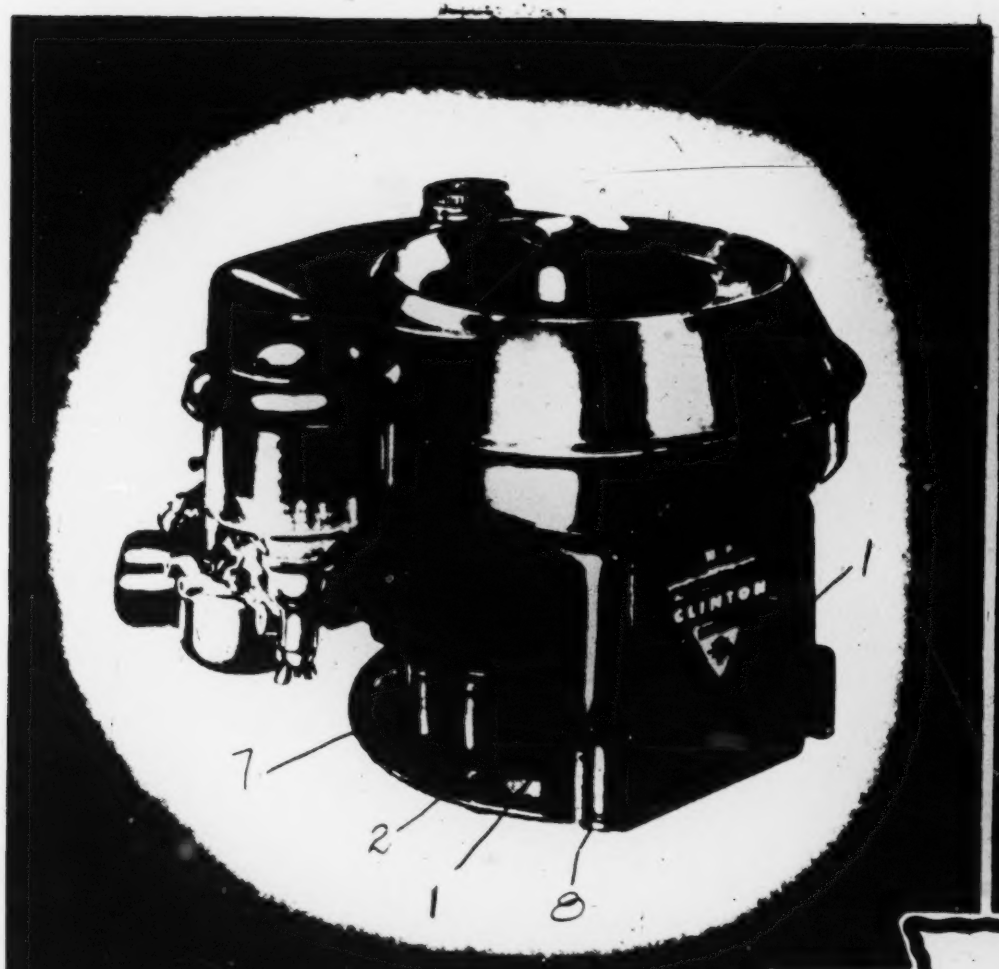
74 No. 1. There are two ribs at the bottom of the crankcase and cylinder which Briggs & Stratton used for their

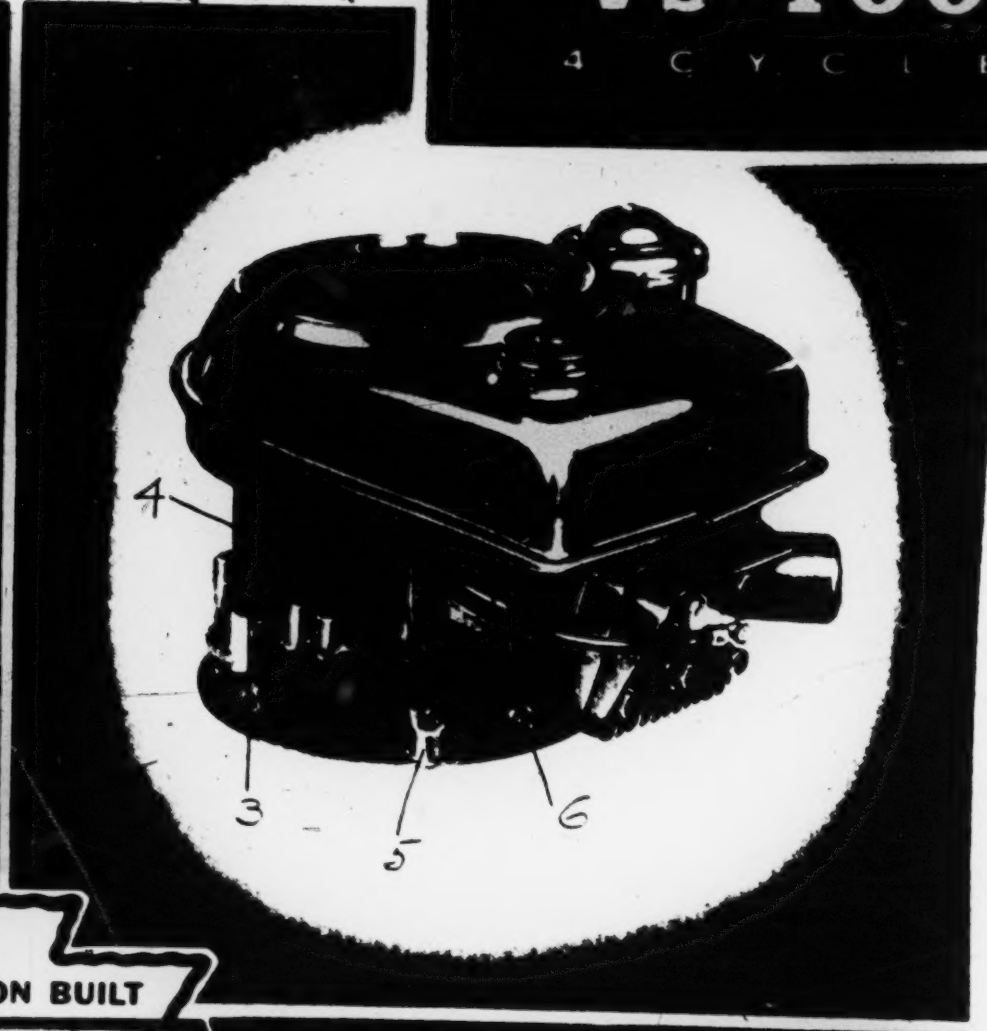
PLAINTIFF'S EXHIBIT 148

SERIES

VS-100

4 CYCLE





PRECISION BUILT

A Wide Range of Models are Made By **CLINTON ENGINE** For Farm, Home and Industrial Use.

CLINTON MACHINE CO

For complete power curve and dimensional specifications, SEE REVERSE SIDE.

	H.P.	R.P.M.
VS-100	1.45	2200
	2.0	2800
	2.5	3600

GENERAL SPECIFICATIONS

Page of Transcript

method of production. That is peculiar to the Briggs & Stratton engine. No. 2, the boss in the picture shown at the left-hand, the boss practically in the center of the crankcase, is peculiar to the Briggs & Stratton engine. The oil filler plug in the right view is peculiar to the Briggs & Stratton engine and is marked No. 3. There is a heavy projection on the cylinder at approximately the center of the view of the crankcase that is peculiar to the Briggs & Stratton engine and was used to facilitate die casting. I mark that No. 4. The mounting boss, which I will mark No. 5, is peculiar to the Briggs & Stratton engine as it has a single hole and a single rib tying back into the main section of the mounting casting. The hole in the mounting casting, which I will mark No. 6, is in a location so that a screw driver can be used to put in the cylinder baffle screw, and this position is peculiar to the Briggs & Stratton engine. Also, the conformation of the casting, which I will mark No. 7, is peculiar to the Briggs & Stratton engine as this casting is cut out in order to
75 clear the cam gear. Also, a round hole marked No. 8 for the mounting screw for holding the crank case or sump to the cylinder at the middle of the left-hand view, is peculiar to the Briggs & Stratton engine.

I am sure that the castings shown in Exhibit 14d are Briggs & Stratton crankcase and cylinder castings and the cover or sump casting, Briggs & Stratton and not a Clinton.

The basic engine illustrated in Plaintiff's Exhibit 14d is the Briggs & Stratton engine with which we are here involved. The exhibit No. 4 would illustrate that.

* * *

Page of Transcript

77 The part to which I gave the numeral 2 is the mounting boss on the left-hand side of the engine facing the spark plug, or facing toward the spark plug.

The four castings in Exhibit 16, casting 16a is the crankcase and cylinder of the Briggs & Stratton 6BHS engine. Exhibit 16b is the base or sump of the Briggs & Stratton engine. The casting Exhibit 16c is the crankcase and cylinder casting of the Clinton engine, and the casting 16d is the cover or sump base of the Clinton engine.

78 The advantages possessed by an engine embodying the disclosure of the drawings of the Lechtenberg Patents are very many as compared to previously known engines of the same type. Both from manufacturing, because of the light weight and many other things. I think I could best illustrate what the advantages are if I could use Exhibit 15.

79 The crankcase cover casting, Exhibit 15a, is for an engine having a plain bearing and with a hand lever starter. The hand lever starter is held in a pocket or hole that is made in the casting. This lever or its hole is also used by many of our customers for mounting an idler pulley for a belt drive. It may be used for a clutch lever, it may be used for mounting a belt guard. We have many engines going out this way. The crankcase cover in Exhibit 15b, is for an engine that would be provided with a gear reduction so that the power take-off would run at a slower speed than the crankshaft. Usually it is six to one. This part, up here, the gear reduction housing can be bolted to this cover in any one of four positions, twelve o'clock, three o'clock, six o'clock, and nine o'clock. These engines are used for the most part

Page of Transcript

by garden tractors and other equipment of that type. The Exhibit 15c, shows a crankcase cover that is suitable for an engine using a belt drive. It has a plain bearing and is used possibly on lawn mowers and light equipment. The crankcase cover in 15d, is equipped— is used on an engine requiring a ball bearing on the output—
80 the outer end of the crankshaft, and is also provided with four mounting holes that can be used to mount water pumps, electrical generators, and similar equipment, where the pump or armature are mounted on the crankshaft of the engine, therefore, a ball bearing is needed to hold it to very close limits. The crankcase cover or sump in 15e is for an engine having a vertical crankshaft and a horizontal cylinder, and this cover would be used on a regular rotary mower such as would not be self-propelling. The plate would be strictly on the crankshaft pulley here. The cover plate on 15f is also for a vertical crankshaft engine, for a horizontal cylinder, but has an additional power take-off from the cam shaft, which runs at half of the speed of the crankshaft. And it is used for the—to supply the driving power for self-propelled rotary mowers. There are many other covers—or other covers—like these, such as those that would be used for mounting pumps, that is, that would be used for mounting an outside pump. Also, on the inside some of them are provided with mechanical governors. Most of the engines have governors which are in the blower housing of the engine, but on generators and such equipment where regulation must be close we can supply mechanical gov-
81 ernors—mechanical governors. So also the engines can be equipped with fillers at either side so where they are mounted on equipment they can fill them without getting in the way of other parts. So there are many combinations that can be used on the cylinder, 16a, to get various

types of engines, simply by substituting these various cover plates. There are thirty-six combinations that can be made on the vertical engine. On the present engines that we have, the cast iron engine, we changed the cylinder for all of these particular wants, and also for fuel pumps and mechanical governors, so that the number of patterns and cylinders that must be carried in stock are very numerous; and that is one of the great advantages of this Lechtenberg engine.

There are also some—many other advantages. For instance the price of the engine that was made—vertical crankshaft engine with horizontal cylinder, that was made prior to the Lechtenberg engine, which is our 6AH, in Plaintiff's Exhibit 10, sold to the manufacturer for $30.45. The engine shown in Exhibit 12, which embodies the Lechtenberg Patent, sells for $21.25. So there is a reduction of $6.20 between the two engines. And the engine in the Lechtenberg Patent delivers more horsepower than the one—the 6AH in the Exhibit 10. Also, the weight of the engine in Exhibit 10 is 36 pounds. The weight of the engine in Exhibit 12 is 19½ pounds, which is a tremendous advantage to a rotary mower that has to be pushed by hand. Also, there are pumps and generators and all kinds of portable equipment that it is a tremendous advantage in light weight.

In making the changes I have identified, or possibilities I call them, the cylinder does not have to be changed, although we do have two. The vertical engine, or the engine in which the cylinder is vertical and the crankshaft is horizontal, we put two lateral extensions out at the bottom of the cylinder which form the mounting feet. These two projections are put out and that is the difference between the cylinder—I don't know how to

Page of Transcript

identify it —. Let's refer to the Lechtenberg Patent No. '789. I have reference to the feet shown in Figure 23 of the Lechtenberg Patent '789, the dotted line portion. The dotted line portion is different — on those particular parts we have made our molds so by changing several inserts we can make either casting in the same steel mold. So they are interchangeable. Also, the cylinders, if we ever want to, we could use the cylinder with the lateral extended feet in a horizontal engine and it could be used that way for service. Also, we have made the cylinder used on the horizontal cylinder and vertical crankshaft engine we assume will be used with generators and pumps, and let the pump and generator hold the engine, so no feet would be used.

84 The majority of the engines are sold by Briggs & Stratton to original equipment manufacturers; there are some sold for service, and some sold over the counter; but the biggest—by far the majority is sold to original equipment manufacturers. I participate in the sale of Briggs & Stratton engines to our customers. I go out from time to time. In going through the sales, we do not go through the ordinary purchasing agent. Through an original equipment manufacturer, it might be the president of the company who would see what engine was to be bought, and also the engineering department comes in to it. They make many, many tests of our engine before they approve it. It goes far beyond the purchasing agent himself, I would say. We don't sell our engines to some one who has been reading a colorful ad, for example.

85 The engines we build with vertical crankshafts and horizontal cylinders, similar to this shown in Exhibit 12, are used on rotary lawn mowers, practically all of them.

There a few people that use them for other things, but they are very small. As to whether or not there has been a long felt need or demand for a light weight horizontal cylinder, vertical shaft four-cycle engine, I would say that the demand has always been there, but probably we didn't know it as soon as we should have. The Briggs & Stratton horizontal cylinder, vertical crankshaft light weight engine of the Lechtenberg type has made a tremendous change in the power lawn mower industry picture, I would say. This is an estimate, but I would
6 say it has been a well-thought out estimate, that prior to the advent or the placing on the market of the engine embodying the Lechtenberg Patent that there were more two-cycle engines in the rotary lawn mower field than there were four-cycle. And I believe that in the last year, in 1954, since this engine has been in use there are more four-cycle engines sold for rotary lawn mowers than there are two-cycle. The question of the advantages of a four-cycle engine over a two-cycle engine has been debated but I would say that the four-cycle engine has many advantages over the two-cycle on a rotary lawn mower, and the reason for the advantages solely stem from the method of lubrication. In a two-cycle engine, the lubrication or oil is mixed with the fuel. And that has some inherent disadvantages that show themselves in many ways. For instance, I know that instruction books for two-cycle engines, they ask for the ports or the exhaust ports of the engine to be cleaned every twenty hours. Which is very difficult for the class of trade that these lawn mowers are sold to. There are no ports in
7 the cylinder on the Lechtenberg in the same sense. In the four-cycle engine it uses an intake and exhaust valve, and what corresponds to — cleaning out the ports on a two-cycle would be probably grinding the

valves on a four-cycle, and they are light as—oh, five or six times that, or maybe ten times. Also, there are other disadvantages when you mix oil with the gasoline, in that the spark plugs foul much more readily than they do in a four-cycle. Also there is a disadvantage to the operator of the lawn mower, inasmuch as he is walking directly behind it. The oil mixed with the fuel causes fuel smoke and it is objectionable to many people. And I would say as a general statement that the maintenance on a four-cycle engine is much less than it is on a two cycle. I would say prior to the marketing of the engine embodying the Lechtenberg Patent there were more
88 two-cycle than four. But that has now been reversed. That is based on my belief.

Briggs & Stratton has done a great many things to increase production with a view to meeting the demand for engines embodying the Lechtenberg Patent disclosure. Not only have more employees been put on, but in our present plant we are using every inch of space to increase production, and we have now built, on 85 acres of land we have on the outskirts of Milwaukee, a new plant that is just under 450,000 square feet, in which we will be in production in that plant some time around the middle of this year. And in that plant there will be only engines embodying the Lechtenberg Patent will be made. I am personally familiar in a general way with the problem of marketing the parts that Briggs & Stratton furnishes representatives and dealers. I get the reports of the servicemen and know who they call in their problems, and they come across my desk, and I know a great
89 many problems, but I don't go out and call on them or fix them. There are less parts to stock for the Lechtenberg engine than previous engines, and also you have the

advantage that I speak of, Your Honor, on the cylinders they would not have to stock the large cylinders, they would stock the smaller parts. I don't know exactly how many distributors Briggs & Stratton has, but it is somewhere in the neighborhood of 5,000. You call them distributors. I don't mean service people of all echelons; I don't want to call them distributors.

* * *

98 Mr. Jones asked me—or when I stated the price of our 6AH engine, which is Exhibit 10, the price should be $30.45, and the price of the 6AH Engine involved—under the Lechtenberg Patent is $23.10. Making a savings of $7.35, or a total of over 24%. Understand, I did not read the figures correctly. By the Lechtenberg Engine I have reference to Plaintiff's Exhibit 12.

When Mr. Lechtenberg was given the general assignment to develop a die cast engine, the problems that I
99 as a man skilled in the art knew he would have to meet and solve were these. He would have to make an engine that could be die cast on the equipment that was available. It would have to be made so that it could be assembled under our high production methods. Also, the engine had to perform, it couldn't have any defects, it would have to be equal in performance to anything we had before, and also it would have to meet the requirements of our customers.

When Mr. Lechtenberg came to me with his concept of the engine, Plaintiff's Exhibit 12, I thought the — it was just fine. At the time I thought it met all of the conditions we had to meet. But later on after going into it and really getting into the design and finding out and solving problems that — well, I probably didn't know existed, although they had existed prior to that time,

Page of Transcript

I did not recognize that they existed, let's put it that way. The way that Mr. Lechtenberg solved these unappreciated problems I have just referred to or mentioned was this. In this engine there is one major part as the cylinder and crankcase which — I think the best way to put it, is a constant piece, and a base or cover which was a variable. Therefore, we could hold the cylinder and crankcase constant for all different kinds of engines, and simply change the minor cover plate so that by changing those we could meet all of the requirements of our various customers. The major constants in the—this major casting are the breather, here, the breather with its baffle right alongside of the valve tappets; the valve chamber and its compartment for the spring; the valve guide; the valve seat; and the engine bore; and the main bearings; in fact of all of the parts in the engine. The ignition system, for instance, on the other side. That includes the coil. The coil and everything were constant in all types of engines. These constants I have referred to are not altered or changed when a different type of plate is used to change the possibility of the use of the engine. The cylinder is constant in all these engines. It is only the cover plate that is variable. When I speak of the cylinder being constant I am also speaking of these parts that go with it that I have identified.

* * *

Cross Examination

Exhibit 20 is an engine manufactured by Briggs & Stratton Corporation. It is not a vertical shaft engine, it is a horizontal shaft engine. Briggs & Stratton first placed a vertical shaft engine on the market, in, I believe it was 1949. That was a sand cast engine with some die cast parts. Cast out of — what would normally be cast

iron. These die cast dies were very expensive, some of them run into as much as $30,000, and, of course, some dies will cost less than that and others will cost more — depending upon the complications of the parts to be cast. That is an important factor. A manufacturing company would go to that expense, getting these expensive dies to do die casting, because they find it would be profitable for them to do it in the long run. I don't see any reason for doing it to get greater production, I can see doing it to get cheaper production. You can make as many of the others as you want. When we made it by the die cast the price was lower to the trade.

* * *

112 I saw an engine put out by McCullough, a vertical shaft engine, quite a few years ago. That was long before we put out this so-called Lechtenberg Engine. I think I would recognize one of those engines if I were to see it now. Defendant's Exhibit D-7 is a McCullough En-
113 gine such as I referred to in my last statement. And that engine was known and on the market prior to the advent of the so-called Lechtenberg Engine. Lechtenberg was not the conceiver of the circular flange or facing plate. We had the circular flange in our own engine prior to the Lechtenberg Patent. But not prior to McCullough. We saw the circular flange or plate on the McCullough Engine, I imagine that is where we got the idea.

There are parts in the picture in the left hand side of Exhibit 14d prime showing the cylinder and crankcase that are the same as shown in the patent drawings
114 of the Lechtenberg Patent. That would not generally be true of any cylinder and crankcase, they don't all look generally alike.

Page of Transcript

We first put a vertical shaft engine on the market in 1949. It was in June, of '49. And that was subsequent to the time we became familiar with the vertical shaft engine put out by the Clinton Machine Company. These vertical shaft engines that the Plaintiff put out in 1949 were not die cast. They had come die cast parts, but the main parts were cast iron. The crankcase and cylinder
115 were not die cast. It was a sand casting.

* * *

117 I have had quite a little experience with die casting. Fourteen years. Now, if I were to remove the bottom of this crankcase at this bottom wall—I am now holding Exhibit 17a with the cylinder upright—and the side wall closed instead of being open as it is on the exhibit, I could die cast it with minor modifications. Here we have in Exhibit 17a, a box-like structure constituting the crankcase opened at one side. Now, what we are going to do is close that side and open the bottom side. Now, the cylinder is in an upright position. When that is done, you can die cast that structure. You can get your die in
118 and out by these bosses with minor changes. You could make this come there. I said with minor modifications. Oh no, not without changing the structure. I said, any one that knew anything about the art could change it and modify it so we could die cast it. You could die cast that, assuming that this wall was closed and the bottom wall was opened and leave these bosses in there. He would get his die out because he would leave off right above the bosses and core them in from the other side. You would not have to have a long rib in there. You would have the rib in there but you would hollow that out from the opposite side. From the die casting.

Page of Transcript

120 We knew there was a market for a vertical shaft engine long before even McCullough or Clinton came out with their engine. But that we didn't consider the market big enough to be worthwhile getting into it had something to do with it, yes.

* * *

122 I have seen an engine constructed like Defendant's Exhibit 8 before, I think. That is one of the old vertical
123 shaft Clinton Machine Company Engines. I believe it was put out prior to the placing on the market by Briggs of their vertical shaft sand cast engine. I don't know the dates of that particular one. We knew of the construction of that when the so-called Lechtenberg structure was developed. At the bottom of this crankcase forming a part of Defendant's Exhibit D-8 I can see the bosses on the wall that support the crankshaft. And the bosses serve as a bearing for the crankshaft. Then there is another boss projecting upwardly just in alignment with the camshaft. That just projects a very small amount
124 from the bottom. Yes, there are inwardly projecting bosses on the base shown in Figure 10 of Lechtenberg patent '789. They are for supports for the crankshaft and camshaft bearings, rather. And the crankshaft extends through that higher boss, it extends through the hole 13.

There is, a similarity between the bosses in your exhibit D-8, and in this Fig. 10 and I would say that there are bosses in all our other old engines as well. I would also say there are inwardly extending bosses in our cast iron engines that have been built for years. This use of bosses such as shown in Defendant's Exhibit D-8 and the Lectenberg Patent '789 were not new with Lechten-
125 berg. There have been bosses in engines ever since I can

Page of Transcript

remember. I wouldn't agree they were used for the same purpose. There were bosses used to support the crankshaft. There were bosses used as support for the camshaft.

* * *

127 Examining Exhibit 17a it is not necessarily a fact that when that engine is in use the open side of the crankcase is facing downward. It is used that way sometimes. Now, when you put this cover plate on this you have a closed box. If you cover any crankcase completely you will have
128 a box. Exhibit D-8 has two parts removable. The crankcase has two parts. If you had just the bottom opening,
129 the side opposite the cylinder, you couldn't put the crankshaft into the engine. It is open on two sides. It is open as shown there in that Exhibit, the—the side opposite the cylinder is open and also the side at the bottom is open and covered. By "the side opposite the cylinder" I mean looking at the engine from the lower part of the blower housing, I mean the—the side of the engine nearest to me. When this crankcase is closed—I understand this crankcase has been cut away—When this crankcase is in proper condition you have a sump down at the bottom, a place to receive oil. On the Briggs & Stratton cast iron engine we have a sump, but not like that. All
130 four cycle engines have to have some place for the storage of oil, yes. Let me qualify that, all of the engines of this type. There are some that run with a dry sump. The idea of having a sump for the storage of oil or lubricants, that was not novel when Lechtenberg started to construct this so-called Lechtenberg structure. All four-cycle en-
131 gines need a place to store oil.

In Exhibit 19 of the Clinton VS700 cylinder it differs from the Lechtenberg Patent in that the upper wall of the crankcase and cylinder is open so that the crank-

shaft can be installed through the top. It is also open
132 on the side opposite the cylinder so that the connecting rod and other parts can be assembled; which is not true of the cylinder in the Lechtenberg Patent. Also, it has a steel baffle which does not completely enclose the opening to the breather. It has the construction of the crankcase is in the cam gear bosses are different in that they are simply a support for the cam gear. The bearing of the valve bearing is altogether different. So the cover plate of Lechtenberg carries a boss to serve as a bearing for the crankshaft, and another boss to serve as a bearing for the cam shaft. And that coverplate is on the bottom when the engine is used with the crankshaft in the vertical position.

133 Now you will note upon an examination of Defendant's Exhibit D-9 that the boss carrying wall has been cut away. Now, you have a removable plate with inwardly projecting bosses, but it wouldn't work in an engine. Because you have two surfaces coming together with a gasket and you can't ever make it tight. They can't
134 put a gasket in between the meeting metals in Defendant's Exhibit D-9 for the simple reason the gasket must cover a flat surface entirely. Where you have two gaskets inserted at right angles right where the gaskets intersect they will leak.

* * *

138 It is most difficult to say exactly what is the principal advantage of an engine constructed according to the Lechtenberg patent. But I should say one of the major advantages is in the constant cylinder and varying the cover plates for the various types of engines. Also, there
139 is the advantage of the of the construction of the Lechtenberg Patent in that it reduces the cost of the engine

Page of Transcript

more than twenty-four percent, which increases our market tremendously.

• • •

149 There is a boss designated as 156 in Fig. 5 of the Lechtenberg Patent. And a corresponding boss in the physical exhibit 16-b. And the corresponding boss in physical exhibit 16-d. The function of those bosses is to form the bearing for the crankshaft on the power take-off side of the engine. There is a similar boss in the engine, Defendant's Exhibit D-8. The function of the
150 boss ! referred to in Exhibit D-8 is to support the bearing for the crankshaft.

Q. Now, did those bosses in those three physical exhibits we referred to, Defendant's Exhibit D-8, Plaintiff's Exhibit 16b, and [Plaintiff's] Exhibit 16d, perform their function in substantially the same manner?

A. Yes, all support the bearing for the power take-off end of the crankshaft.

Q. They perform that function in substantially the same manner?

A. I don't know whether this engine Defendant's Exhibit D-8 does, but the previous engine we had did not. I would say this one does.

Now on the top wall of the crankcase of Defendant's Exhibit D-8 there is a dependent boss which serves as a support for the crankshaft. That is the zinc die cast
151 magneto plate. Now, in this physical exhibit 16a and the physical exhibit 16c, when that engine is used with the shaft vertical there would then be dependent from the top wall a smaller boss. There is dependent from the top a boss supporting the upper end of the crankshaft.

Page of Transcript

Q. And that boss functions substantially the same as the boss projected from the upper end of the crankshaft in the upper end of D-8, doesn't it?

A. It supports the upper end of the crankshafts, yes.

Q. There is a boss projecting from the upper wall of the Lechtenberg structure 789 when that engine is used with the shaft vertically, and that boss dependent from the upper wall serves as a support for the crankshaft, isn't that correct?

A. That is the same question as before

Q. That's right.

152 A. Yes.

Q. And that performs its function the same as the boss projecting from the upper wall of Defendant's Exhibit D-8, and Plaintiff's Exhibit 16a, and Exhibit 16c, that is correct, isn't it?

A. You are speaking of function?

Q. Yes.

A. That is the same function, yes.

Q. Performs it in the same manner, too, doesn't it?

A. No. In Defendant's Exhibit D-8 the upper bearing for the crankshaft is supported in a zinc plate which has to have a liner in order to work. In Exhibit 16a the boss is an integral part of it and composed of aluminum
153 and has no liner, so it doesn't perform in the same manner.

Q. Do these bosses in Exhibit D-8 function the same as the bosses as disclosed in the Lechtenberg 789?

A. By the word function I would say that if the function is to support the camshaft they were the same.

* * *

Page of Transcript

156 Q. So those bosses, while they serve indirectly at least as supports for the camshaft, do function differently when you are using the type of structure shown in Exhibit 18c and the type of structure shown in 17d?

A. There is a difference.

• • •

160 Examining Fig. 9 of the Lechtenberg Patent 789, the passage to which the numeral 35 is directed connects with the passage 36 and also with the interior of the crankcase through a long oblong hole adjoining the passage closed by 35 and the passage closed by 36. This hole opens up when the cores or when the casting is bored out after it is die cast. I know in die casting what is meant by "kissing cores". I would say those passages are made by the passage of three kissing cores. Explaining what I mean by kissing cores the terminology of kissing cores is not correct, the cores do not touch. If the cores touch the wall would become inoperative. But what it means is, there are cores that come very close to each other and form what we call flash, that can be knocked out
161 easily to form an opening. When you use kissing cores they don't abut together. They will score if they do. And when a casting is made those two passages formed by a core probably are in connection with each other for practical purposes, but the cores do not touch, there may be ten to fifteen thousandths of metal between, which is easily knocked out; but they do not touch. That method of making connections between the passages and elements was old for two cores, yes, but I don't know of it in three cores. By three cores I can best explain it by looking at Fig. 9 of the Lechtenberg Patent 789. The passage 36 would be made by another core, both of those cores — being stationary cores in the mold. The opening — the

side toward the sump on the left-hand side of Fig. 9 would be controlled by the core that formed the hollowed
162 out portion of the cover. All of those cores are stationary cores. Now, in the Lechtenberg Patent 789 as set out these passages 35 and 36 connect with each other because they break through a hole of the cover plate. Examining Defendant's Exhibit 5, I find there a passage breaking through a wall into another chamber. Yes, breaking through one wall. You have got just two cores there. In the structure shown in Fig. 9 you have three cores. The
163 opening 35 is made by a core in the mold. The opening 36 is made by the second core in the mold — let's call it the second. The opening on the left-hand side of the passage 36 is made by the third core.

The Court: The metal between the 2 and the 3 to be [broken away?]

A. Yes, the metal between every core, Your Honor.

In Defendant's Exhibit D-3 I find one passage communicating with a chamber or other passage through a common wall. There is one — one movable core connecting with the stationary core, as you would say. There would be only two so-called kissing cores used in forming that passage, but there may be other — there are
164 other cores in that casting. In Fig. 9 in the Lechtenberg Patent 789 there are three so-called kissing cores, and they are all stationary. In Exhibit 16b you have one core which forms the passage for the oil inlet. And you have another core which forms the passage for the oil
165 outlet. The large core is used to form the hollow portion of the casting in 16b, I believe.

* * *

169 So now we come down after we have discussed the function or structure and the operation and the results

Page of Transcript

of the Lechtenberg Patent, we find what he actually made was new was an engine that was lighter and cheaper, certainly, that is correct. When the Lechtenberg Structure set out in Patent 789 was originated, Briggs & Stratton were after the objective that was shown in the preamble of the patent, we wanted to make a better engine, a cheaper engine, I mean, a less expensive engine to build and also a better engine. And a lighter engine, that is correct, that was our hope. Now, if we were to do that

170 if we were to build this engine shown in Exhibit D-8 out of aluminum instead of out of cast steel, we would have a lighter engine. So to get lightness we had to change material, to get lightness we changed from steel or iron to aluminum on some parts where we could.

171 On rotary lawnmowers which have a deck on which the engine is mounted, some of those decks have holes already made in them, some of them don't. But those that don't have the holes made in them, they have deck templates to locate the holes. So they have standard spacing.

173 In the manufacture of the small engines that would be mounted on manufacturer's mowers you do not necessarily have to stay within certain dimensions. You cannot make it as large as you want or as small as you want. You have to stay within certain dimensions, yes, but you have certain variations, not exact dimensions.

* * *

175 The device shown on the panel to the left in Plaintiff's Exhibit 7 is taken from a Briggs & Stratton Engine, and

176 also from the Madle Patent 2,605,753. And the one to the right was taken from a Clinton Model 2500 Engine. There is an actuating cam shown in that chart on the panel to the left, that is the drawing made from the

Madle Patent. And there is a centrifugally actuated arm. The arm is in the color yellow. The cam is made in the color blue. The cam is mounted on the swinging arm, which is colored yellow. I find an arcuate swinging arm in that structure shown in the panel to the right.

Q. Do you find any cam mounted on that swingable arcuate arm?

A. There is a cam attached to it.

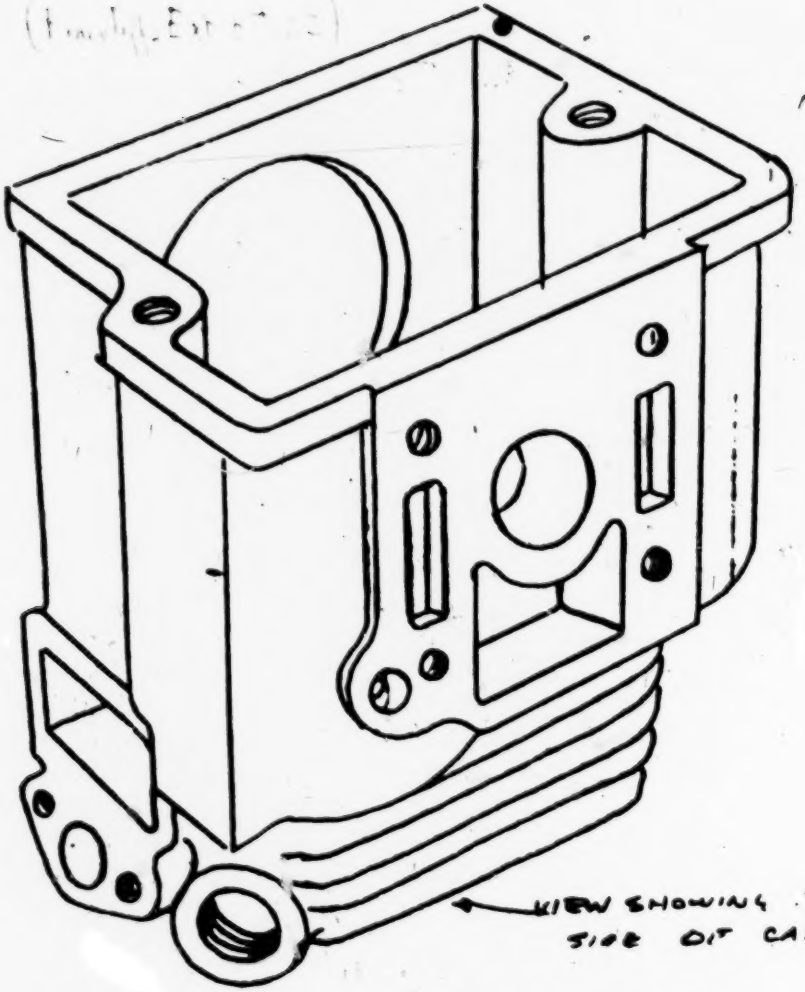
177 Q. Is there a cam mounted on it?

A. There is not a cam mounted on it, I wouldn't say.

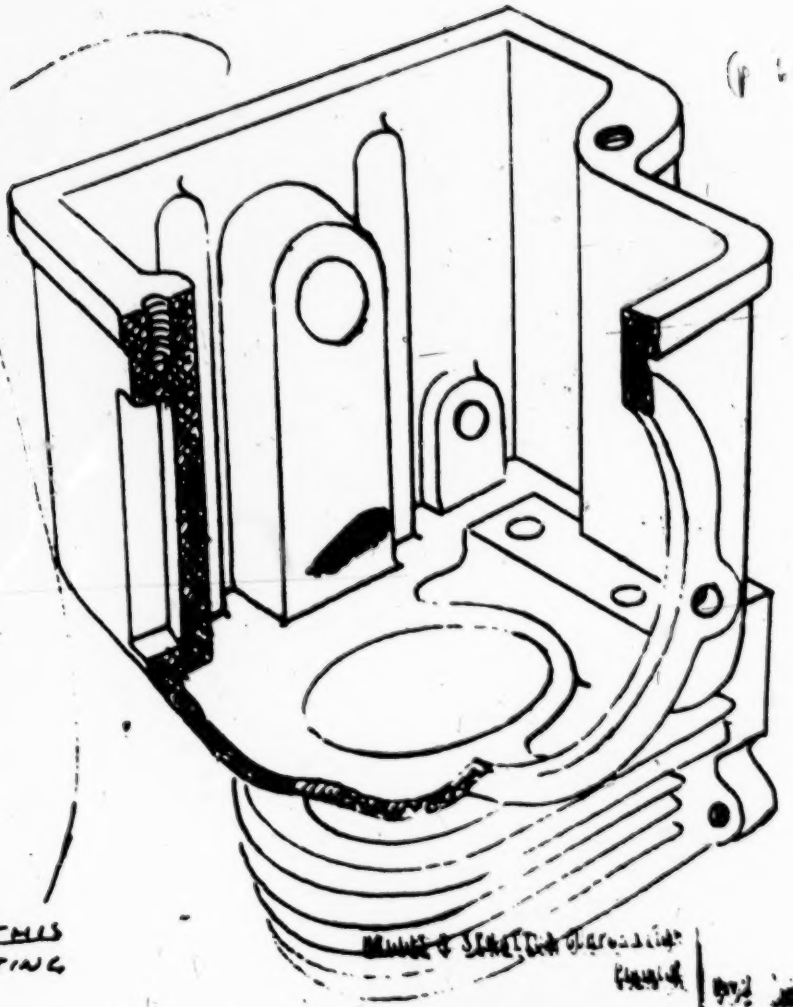
Redirect Examination

The cylinder and crankcase casting shown in Exhibit 19 could be die cast with minor modifications. Such an engine would operate. It would not have the advantage I have outlined as exists in the Lechtenberg Patent. Exhibit 22 is a drawing which I had made of the exhibit — of the engine cylinder and crankcase in Exhibit 19 to show how this cylinder came to be die cast and the modification that would have to be made to do it. That change 178 there would not involve any great knowledge beyond that of the ordinary die caster. I just gave it to one of my men, and they did it.

179 There is a tremendous advantage in the manner Lechtenberg made the oil filler port, and the drain port, which is not present in the Defendant's Exhibit D-3 and D-5. The advantage is that the oil hole has to be out where the oil — where the operator can get at it; and in the Lechtenberg Patent the two cores are parallel in the diecast mold so as the blanks move apart the core comes with them. In the method shown in the small base, Exhibit D-3, a diagonal core — a movable diagonal core has to be used which has to be actuated by use of hydraulic



VIEW SHOWING THIS SIDE OF CASTING



Filed DEC 12, 1955

Leo Nowicki, Clerk,

By [illegible]

Substitute Exhibit 4-10

PLAINTIFF'S EXHIBIT NO. 22.

Page of Transcript

cylinders. In the design of the Lechtenberg Engine, this is not being used. And if one were to really describe
180 the difference between the base in Exhibit D-3 and in the base or sump in the Lechtenberg Patent, if one core was omitted in the Exhibit D-3 the base could be filled just the same. If one core were omitted in the Lechtenberg Patent all of the openings would be closed — or the opening — there would be no connecting means between the points.

The McCullough Engine, Defendant's Exhibit D-7, is a vertical crankshaft, two cycle gasoline engine.

Recross Examination

There were two so-called aluminum engines before Briggs & Stratton put a small aluminum engine on the
181 market, I believe. I am not sure whether the Exhibit D-7 engine is all aluminum, but I think it is.

Redirect Examination

I believe it is true that Briggs & Stratton was the first to put on the market the first all-aluminum four-cycle engine.

JOSEPH ROBERT HARKNESS

Direct Examination

182 My name is Joseph Robert Harkness, my age is 39, my place of residence is 2773 North 84th Street, Milwaukee, Wisconsin, my occupation is electrical engineer with Briggs & Stratton Corporation. I graduated from the University of California in Berkley in December of 1935. I immediately went to work with the General Electric Company, and worked for them three years — for three years as a student engineer, and later as a de-

signing engineer. From 1940 to 1945 I worked as an electrical engineer with the General Electric Company. I was in charge of the development and designing of aircraft ignition systems. The ignition systems were used in the engines used on the P-47 Fighter Aircraft all through World War II. After that time for three and a half years I was in charge of mechanical design on the General Electric Company guided missile program.
183 By the way, I received from the University of California the Bachelor of Science Degree in Electrical Engineering. I have been with Briggs & Stratton some little over six years. I have been their Electrical Engineer and I have been responsible for the design development and engineering of their ignition system.

In a magneto the breaker points have an electrical function insofar as creating the spark, which is used to ignite the mixture in a combustion chamber. For this reason the time at which the breaker points operate or more specifically open determines the time at which ignition of the mixture occurs. Therefore, the timing of the opening of the breaker points is important to the
184 operation of the engine. The spark occurs at the spark plug there shortly after the point of the breaker opens. It is a matter of micro-seconds later. Referring to the Madle Patent, and first to Fig. 4, which shows a part of the gears dotted or in dashed lines the smaller gear is mounted on the crankshaft of the engine, and the larger gear is carried by, or part of, the cam shaft of the engine. And when I say camshaft I mean the shaft which operates the valve actuating cams. This gear which is No. 38 in Fig. 4 carries cam 37, which during the revolution or rotation of gear 38 passes under the arm 35 which is attached to a shaft 27. This shaft 27 is carried through

185 the wall of the crankcase, as can be seen in Fig. 6 on the next page, and at the outer end of this shaft is attached the breaker point which opens and closes with the stationary breaker point 30 to operate and control the ignition system, and thereby produce a jump spark. Now, to clarify this, the stationary breaker point is 30 and the one that is operated by the mechanism I have described is the movable breaker point No. 29. As shown in the drawings of the Madle Patent, shaft 27 has a rocking motion. Part 36 is the cam follower, and as the cam follower moves due to the passage beneath it of the cam, the Breaker point also moves, since they are both fastened solidly to rocker shaft 27. The part 35 carries the cam
186 follower. The manner in which the cam 37 is mounted on the crankshaft, or camshaft carrier gear 38 can best be seen on Fig. 7 and 8 of Sheet 3 of the subject patent. No. 45 in Fig. 7 is a weight. This weight is mounted on the cam gear by having a round boss at one end which acts as a journal, and it is journaled in a boss on the inside of the cam gear. This weight is held toward the axis of the camshaft by the spring 47, and under the influence of centrifugal force in No. 45 as the speed increases there is a tendency for this weight 45 to move away from the axis of the camshaft. Attached to this weight 45 is a breaker cam 37. This cam is attached in such a position that motion away from the axis of the camshaft moves the cam in a more or less circular or peripheral motion around the axis of the camshaft. This results in the cam having a somewhat different angular position with respect to the camshaft at high speeds than
187 it has at a standstill. In Fig. 4, or referring to Fig. 4, the camshaft rotates at one-half of the speed of the crankshaft due to the one to two gear ratio, and therefore, the

Page of Transcript

cam passes under the cam follower once every two revolutions of the crankshaft.

That breaker point opening does not occur always at the same point in the revolution of the crankshaft. At low speeds the fly weight, or weight which I mentioned, is held close to the axis of the camshaft by the spring, and consequently the cam lip or cam follower contacts at a later time during the revolution of the crankshaft than it does when the engine is rotating at high speed and the weight has been moved outwardly by centrifugal force. This results in an earlier opening of the breaker contact when the engine is operating at a higher speed. Referring to the shaft 27 in Fig. 4 for example, the advantages brought about in the structure shown in the Madle Patents by reason of that shaft and of the members associated with it are as follows. Shaft 27 performs
188 the important function of allowing the cam follower surfaces, which are rubbing surfaces, to be within the crankcase of the engine where they are subjected to continuous lubrication, from oil splash, and at the same time allowing the breaker points, which must be in an oil free region, to operate successfully, to be so located, and also it allows the breaker points to be in a very accessible position on the engine so they may be inspected and adjusted very easily.

With respect to Plaintiff's Exhibits 20—20a, 20b and 20c. Referring first to Fig. 8 on Sheet 3 of Patent '753. In the upper view, that is Fig. 7, this flywheel, which is acted upon by centrifugal force, this spring No. 47 in the illustration, retains the weight close to the axis of the camshaft at low speeds. The cam 37 in Fig. 8 is this cam which is attached to the follower weight, and by motion of weight 45 which occurs due to centrifugal

force at high speeds, the motion of the cam is effected
189 so that the time at which it passes under the cam follower is dependent on the speed of the camshaft.

The Patent drawings in figures — in all of the figures of the Patent '753, correctly represent Exhibit 20c. Removing the cover of this Exhibit 20d exposes the parts which show in Fig. 5 of Patent '753. The cam follower which is Part 36 in Fig. 6, is this part which is inside the engine in a lubricated space and it is connected through boss or bearing 25 by a shaft which is 27 in Fig. 4 to the breaker points which show in Fig. 5 and the actuation of which can be observed by moving cam follower 36. This, therefore, is accurately — Exhibit 20d is, therefore, accurately represented by the drawings in
190 Patent '753. The breaker assembly Exhibit 20d is mounted on the surface of one-half of the crankcase of the Exhibit 20b in this manner. (indicates) The camshaft, which I have already described, rotates within the crankcase of the engine in such a position that the cam surface passes under the cam follower, which is this point in 20d. This allows the breaker points to be mounted externally in an oil free zone and also in a position which is easily — at which they are easily inspected and serviced, but allows the cam follower and the cam to operate in a well-lubricated zone within the crankcase of the engine.

191 Exhibit 20b has the power take-off side or end wall of the crankcase, and the opposite wall of the crankcase. The side wall of the crankcase on which the breaker mechanism is mounted allows the breaker mechanism to be mounted close to the power take-off end wall of the crankcase. The magneto rotor is located on the opposite end of the crankcase from the power take-off end or face. Fig. 1 of the Patent shows the breaker box to be

located near the power take-off face of the crankcase, and shows the flywheel on the opposite end. Fig. 2 shows the magneto rotor to be mounted within the space enclosed by the flywheel, No.15 in Fig. 2. This Exhibit 21d is also a breaker mechanism to be mounted on the external surface of a crankcase of an internal combustion engine. And it also allows the breaker points to be in an oil free zone and to be readily available for inspection and adjustment, and it also is so designed that the breaker points are actuated by a cam follower which can be located within a well-lubricated zone of an internal combustion engine. Plaintiff's Exhibit 21c is a cam gear and camshaft assembly on which is mounted a weight similar to that found in Exhibit 20c. This weight is restrained or pulled toward the axis of the camshaft in both cases by springs, and it also — the weight also moves in both Exhibits away from the axis of the camshaft under centrifugal force, when revolving at sufficient speed. In Exhibit 21c the result of this action away from the axis of the camshaft is a rotation of the cam which results in the opening of the breaker point at an earlier time in the engine, essentially at higher speeds, and at a later time at low speeds, which is also the function of the mechanism
193 in Exhibit 20c. This is the cam follower in Exhibit 21d and its motion rocks the plastic lever in such a way that the breaker points are open when the cam follower moves toward the assembly, thereby resulting in opening of the breaker points. The parts to which I referred as "this", is the plunger-like cam follower for transmitting the action between the inner end or the end which will be in the crankcase in the normal assembly, and the outer end which is in the breaker box in the normal assembly. This breaker box assembly 21d is mounted on one-half of the crankcase in a position similar to that in which

Page of Transcript

the other breaker box is mounted, in such a way — in such
194 a position near the power take-off face of the engine in 21b that motion of the crankshaft brings the cam surface beneath the cam follower portion of Exhibit 21d. The position of mounting on one face or wall of the crankcase near the power take-off end appears to be very similar to that in the Madle drawings.

Cross Examination

I know what is meant by a normally closed circuit or a normally open circuit in the normal ignition system. And this Madle Patent is designed for use on a normally
195 closed system. So when you get your circuit you commonly open — you break the circuit.

Q. I notice you mentioned there that this crankshaft is driven at twice the speed of the cam shaft. Did you get that from looking at the drawings or did you get it from the specifications?

A. Neither.

Q. Can you tell by looking at Fig. 2 that the crankshaft is driven at twice the speed of the cam shaft?

A. No.

Q. And it might be driven at any proportion, might it not, depending upon the size of the gears?

A. It would not function properly as a camshaft.

196 It was not new to rotate the camshaft 23 at half of the speed of the crankshaft. Prior to June 7, 1951, with
197 respect to whether or not the breaker points had ever been mounted on the outside of the crankcase of an internal combustion engine, I believe every automobile has breaker points outside of the crankcase. And that made them accessible.

• • •

Page of Transcript

200 Now, in this Madle Patent 753 I referred to Part 45 or the weight, and that weight—you can see it in Fig. 7 quite clearly—and that weight carries the cam plate. And that cam plate is fixed on that weight. And in the drawing it shows the rockable weight 45 fastened on one side of the gear 38 and the cam plate fastened on the opposite side of the plate. In order to do that you have a slot in that gear 38. Now that structure is — method of construction or type of construction is followed in this Plaintiff's Exhibit 20c. You have the rockable weight or arcuate arm, you have a cam plate mounted on that
201 arm. Now, in order to mount that camplate on that arm on one side of the gear with the arm on the other side of the gear, that arm has to have a boss that projects through that slot. And that is shown in the Madle Patent '753. Now, in the operation of internal combustion engines they have such a statement as retarding and advancing the spark, that is quite a common term used in connection with internal combustion engines. And that is not peculiar to the single cylinder engine. In the Madle
202 disclosure the swingable weight 45 is used for advancing the spark as the engine speeds up. You want to advance the spark as the engine speeds up because the time of combustion has a tendency to be constant and the only way in which the combustion can be started earlier so as to have sufficient time before the piston reaches dead center is to initiate the spark at the earlier angular position of the crankshaft. So as the engine speeds up that piston is farther from the top of the cylinder when the spark occurs than when the engine is going at a slower speed. So you have a greater distance between the top of the piston and the top of the cylinder, that is the possible adjustment for speeding up the spark at the higher

Page of Transcript

speed. It was not new to retard and advance the spark in the operation of internal combustion engines, prior to June 7, 1951. That was well known. It was not new to
203 advance and retard the spark by the operation of swinging weights. That was well known prior to that time. And I have seen various types of mechanisms and constructions used to swing weights for advancing and retarding sparks proportionately to engine speeds prior to June 7, 1951.

In Exhibit 21d the rod is moved by a pressure on the end of the rod in one direction and by a spring in the other direction. And the pressure which works on one end of the rod is radially relative to the gear or the crankshaft. Radially on that plunger. It does work out
204 at the other end. What it does at the other end, I would say it rocks. One end of that beam carries the movable structure, the movable contact. There may be motion in that [plunger], the motion of the camshaft may rotate it. I believe it is correct that the operation of those parts shown in 21d does not require a rotation movement of any of those parts. Referring to Exhibit 21c, the camshaft, there is no cam out along this rotating or rockable arcuate arm responsive to centrifugal action.

My answers would not be different to the questions here as to various parts being new, such as the use of rotating cam shaft at half of the crankshaft speed, if the date had been set at March, 1946, instead of June 7,
205 1951. The structure we are talking about, they were made years ago, like rotating the camshaft at half of the crankshaft speed, that was done years ago, and mounting the points outside of the crankcase, that was done years ago. Prior to 1946. This system of adjusting and retarding and advancing the spark by swinging weights, that was known before March of 1946.

Page of Transcript

Now we are going to mount this swingable weight with that cam on it on a gear carried by the crankshaft, then we are going to contact it with the cam follower and cam follower arm, such as shown in the Madle Patent, we are going to start rotating that crankshaft; and now the parts 35, 36, 37, 27, 28, and 29 will operate mechanically in the same way as they are mounted on the camshaft. I refer particularly to Fig. 6. And the
207 swingable weight will operate the same way on that cam plate.

208 A. It is possible to build a four-cycle engine having more than one cam on the camshaft for each valve, in which case their ratio changes are multipliable by two, can be used.

Q. Would that mean more than one camshaft on the engine, sir?

A. No, a single camshaft.

Q. I am referring now to the Madle drawing; would that be possible on the engine shown there?

A. Since the drawings do not show the number of lobes on the cam operating the tappet, it would be possible.

• • •

---

210 E. EUGENE KOHLS

Direct Examination

211 E. Eugene Kohls, age 52, residence 9712 North Lake Drive, Milwaukee 17, Wisconsin, occupation, Patent Attorney. I was first associated with the patent profession in 1919 when I entered the employ of one of the Milwaukee patent attorneys office as a draftsman. The name of the office was Morsel & Keeney at that

Page of Transcript

time. It is now Morsel & Morsel. I was with Morsel & Keeney as a draftsman until December, 1920, when I left to join with a patent attorney in Milwaukee by the name of Ed Hunt, also in the capacity of draftsman. Worked for Ed Hunt a matter of about two months, two or three months, then Ed Hunt took seriously ill and Ira Jones bought out the practice of Ed Hunt, and since that time I have been associated with Mr. Jones. The first several years, and I think probably until 1925, as a draftsman. After that as what we in the patent profession refer to as specification writer until about I think it was 1929 when I was admitted to practice before the
212 Patent Office. As I say, I was admitted to practice in the Patent Office in 1929, and in 1935, I was admitted to the Bar, the State Bar of Wisconsin and the Federal Bar. I have prepared and prosecuted very many patent applications. I am in charge of the application work in the office of—particularly having to do with the Briggs & Stratton applications. And I had charge of the prosecution of the three patents that are here involved. I would say that as to the Madle application, while I did not personally prepare that application, I was instrumental in its prosecution. It was prepared in its initial state under my supervision. But the two Lechtenberg applications were prepared by me and prosecuted by me in toto.

This chart, designated as Chart No. 3, which is in evidence as Plaintiff's Exhibit No. 7 was made under
213 my supervision by Miss Lois Boehm, one of our draftsmen in the office. When I say that we have taken—by we, I mean under my supervision and Miss Boehm actually doing the work, when I say that we took extreme precautions to make these illustrations as accurate and

as perfectly accurate as possible, I am perhaps stating a — stating it very lightly, but I would like to explain that despite those precautions if I had to do this chart over again there would be at least two changes or two things that I would do differently. In the left-hand panel, which is entitled Madle Patent No. 2,605,753, you will notice that there is a line with an arrow on it, and beneath that line is the legend "To Spark Plug." I would have omitted that, or had that omitted, if I were doing it now, because it actually has no part in the subject matter that is here under consideration. It appears simply because Fig. 4 is an absolutely slavish copy — Fig. 4 of the Madle Patent — omitting only the right hand portion of the figure in rotor 16 and the stator 18; that portion of Fig. 4 was omitted for the sake of space and also because it had no part in the subject matter. For the same reason I would have omitted the corresponding arrow in the right-hand panel which bears the legend "To Spark Plug." But I am reminded, of course, that even in the Defendant's Model 2500 Engine, which is portrayed in this part of the chart, there must of course, be a wire to the spark plug.

To best illustrate that Claim 5 of the Madle Patent is readable on and is satisfied by Defendant's Model 2500 Engine, the Claim is broken up into its constituent elements and colors have been applied to all of the immediate elements and particularly the elements of structure as well as numerals — and corresponding numerals and colors are applied to the various elements of the illustration of the Defendant's engine, and also to the reproduction of Figs. 4, 6 and 7 of the Madle Patent. The reproductions or illustrations in the right hand panel are as truly accurate representations or depictions of the Defendant's engine as represented by the Exhibits 21a,

MADLE' PATENT NO. 2,605,753 INFRINGED BY DEFENDANT'S MODEL 2500 ENGINE

MADLE' PATENT NO. 2,605,753

Fig. 4.

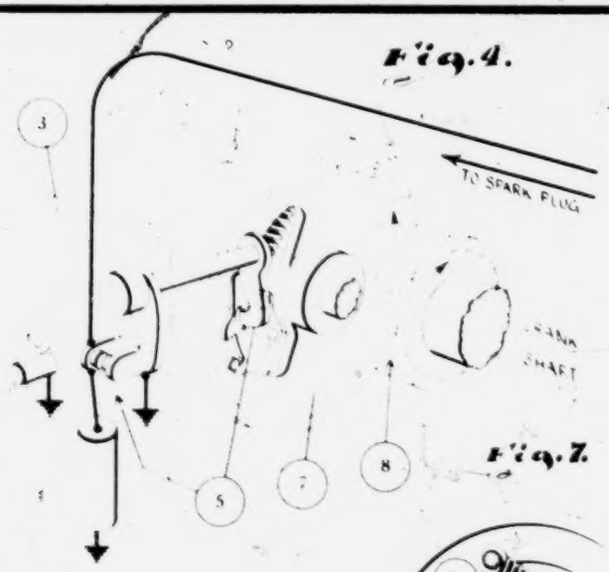


Fig. 7.

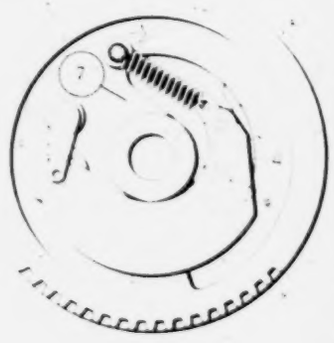
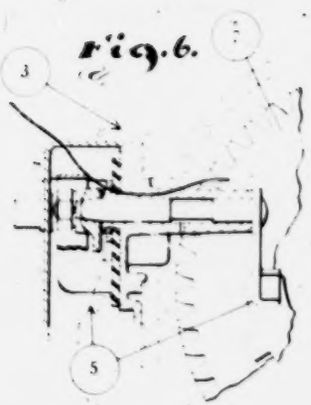


Fig. 6.



TYPICAL MADLE' CLAIM

Claim 5

In an ignition system for a single cylinder four cycle internal combustion engine of the type having a crankshaft driven magneto for effecting spark plug operation

1 fixed and

2 movable breaker point

3 accessibly mounted on the exterior of the engine remote from the magneto

4 a cam follower movably supported by the engine

5 remote from the breaker points

6 a motion transmitting connection between the cam follower and the movable breaker point

such that separation of the points is effected by motion of the cam follower in one direction

7 a rotatable part adjacent to said cam follower

8 a driving connection between said rotatable part and the engine crankshaft

whereby the speed of rotation of the crankshaft determines the speed of rotation of said rotatable part

9 a member carried by said rotatable part for rotation therewith and for motion relative thereto in response to centrifugal force and

10 a cam surface on said member engaged by said cam follower

for imparting motion to the cam follower in said direction once each revolution of the rotatable part to effect breaker point separation at instants depending upon the speed of crankshaft rotation and the position of said member relative to the rotatable part as determined by the centrifugal force acting on said member

DEFENDANT'S MODEL 2500 ENGINE

Fig. 1.

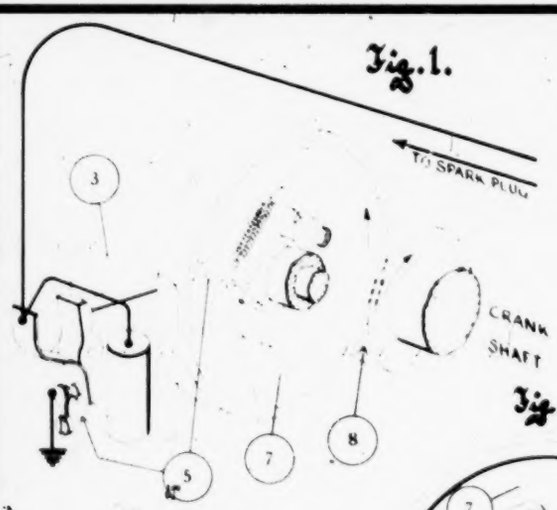


Fig. 3.

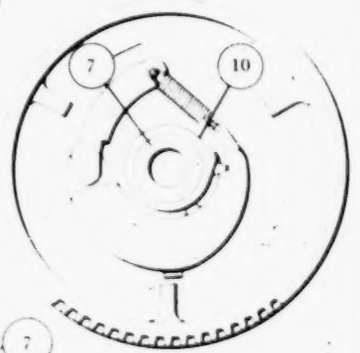
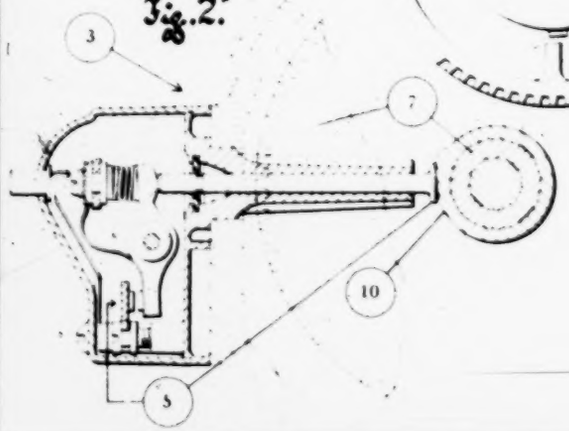


Fig. 2.



IRA MILTON JONES

Page of Transcript

-b, -c and -d, as could be produced. Beginning with the
217 recitation of the introduction of the claim and which I might explain merely states the environment in which the claimed invention is found, we find that the claim calls for, "In an ignition system for a single cylinder, four cycle internal combustion engine of the type having a crankshaft-driven magneto for effecting spark plug operation: fixed and movable breaker points accessibly mounted on the exterior of the engine remote from the magneto." In the claim this is here identified by the numerals 1 and 2 and respectively by the colors I think you would say this is cerise and blue-green. Now in the illustration of the Madle Patent Figs. 4, 6 and 7 in the left-hand panel, the fixed and movable breaker points are readily found by virtue of the application of the respective colors cerise and blue-green. Likewise in the right-hand panel we have the same situation of the fixed
218 and movable breaker points respectively colored cerise and blue-green. The claim continues with the definition that these fixed and movable breaker points are "accessibly mounted on the exterior of the engine remote from the magneto." It is a little bit difficult to illustrate the accessible mounting of the fixed and movable breaker points as specified in the claim by reference to the Figs. 4, 6 and 7 of the Madle Patent alone. Nevertheless, in the light of the entire disclosure of the Patent the designation by means of the numeral 3 and the arrow running to the broken line enclosing the fixed and movable breaker points, and also the arrow leading from the colored circle 3 in Fig. 6, do I believe indicate the fact that the fixed and movable breaker points are mounted on the exterior of the engine accessible and remote from the magneto. The Patent specifications I am quite certain brings out the fact that the magneto is mounted under

Page of Transcript

the flywheel of the engine and hence would be a substantial distance from the location of the mounting of the fixed and movable breaker points. The same manner of distinguishing that accessible mounting of the fixed and movable breaker points and its remoteness from the magneto has been employed in the right-hand panel which portrays Defendant's Model 2500 Engine. Now,
219 we come to the fourth numbered element of the claim—fourth numbered element of the claim, which is "a cam follower movably supported by the engine." That is colored orange and, as we have already observed, there are no numerals — no numbers in the drawings, so we depend entirely and solely upon the orange color to designate and identify the part of the structure illustrated as the cam follower. Now, the claim required the cam follower of course, to be "movably supported by the engine," which is the fact in each instance. The cam follower is
220 attached at the inner end, and viewing the chart in each instance the left-hand panel and right-hand panel, it is at the right-hand end of the shaft which is colored green, and that shaft is — Mr. Harkness testified is illustrated in Fig. 6, it is movably mounted in the engine. Now, I might add at this point that — and I should have done this sooner. I took a liberty — slight liberty in Fig. 6. In Fig. 6 of the Patent drawing you will not find any suggestions of the cross-hatch wall of the crankcase such as appears in Fig. 6 of the Chart. On the chart in the Fig. 6 in the left-hand panel, and in Fig. 2 of the right-hand panel, I have indicated in the broken lines that part of the crankcase which was directly adjacent to the breaker point mechanism, which, as Mr. Harkness testified, is secured to and fastened to the side wall of the crankcase. Column 6, lines 3 to 9 inclusive of the Madle Specifications refers to the location of the breaker con-

Page of Transcript

tact assembly. "One of the objects of this invention is
221 achieved by relocating the breaker contact assembly 21 remote from the flywheel and on the exterior of side-wall 22 of the crankcase which is adjacent to the cam-shaft 23, where it is readily accessible for adjustment or replacement of the breaker contacts."

I believe we left off with an orange color. That brings us to the fifth — numbered element of Claim 5, which reads, "Remote from the breaker points" and that, of course, refers to the mounting of the cam follower and the location of the cam follower. We have attempted to illustrate that by the two arrows which lead from the colored circle which is colored red and bears the numeral 5 in Fig. 4 and Fig. 6 of the left-hand panel, and Fig. 1 and Fig. 2 of the right-hand panel. And that remoteness — that remote relationship between the cam follower and the breaker point is a result of the cam follower being inside of the crankcase at one side of the crankcase wall and the breaker points being on the outside of the crankcase — on the outside of the crankcase wall. The next element of the claim, "a motion transmitting connection between the cam follower and the movable breaker point," is colored green, is identified, rather, by the green coloring in the claim, and in the left and right-hand panel drawing portion there shown.
222 In the left-hand panel. In the left-hand panel this shaft connects the cam follower and the blue-green movable contact. And in the right-hand panel it is the shaft colored green which extends to the left from the button-like cam follower colored orange and bears against the one end of the medially pivoted lever also colored green. It is by virtue of this connection between the orange-colored cam-follower and the movable breaker point,

Page of Transcript

223 which is colored blue-geen, by virtue of this connection that it is possible to have the breaker points — the breaker mechanism located outside of the crankcase at one side of the crankcase wall, while the cam follower and cam against which it bears, which being rubbing parts or relatively movable parts requiring lubrication, can be inside of the crankcase wall where they will automatically be lubricated. There is nothing in this Claim 5 that requires the motion transmitting connection to be either rotatable or longitudinally movable. Claim 5 merely defines this motion transmitting connection as a connection. And obviously, of course, the term "connection" would be satisfied by many different mechanical devices or expedients. The Claim continues with the further definition of the motion transmitting connection in the language, "such that separation of the points is effected by motion of the cam follower in one direction." And then goes on with a recitation of a rotatable part adjacent to said cam follower. That rotatable part finds response in the Madle structure as well as in the Defendant's Model 2500 Engine by or in the large gear which is on
224 the camshaft and meshes with the smaller gear on the crankshaft. The color brown has been applied to this element of the claim and to the identifying circles in the left and right-hand panels, which incidentally also bear the numeral 7. The next element of the claim, and quoting now, "a driving connection between said rotatable part and the engine crankshaft," as I have already indicated, is provided by the meshing gears on the camshaft and the crankshaft, and which in the drawings are identified by the numeral 8 and the arrow leading therefrom and the comparable coloring. That driving connection, of course, supports the following item in the claim, quoting,

Page of Transcript

"whereby the speed of rotation of the crankshaft determines the speed of rotation of said rotatable part." The next element of the claim to which I have applied the color yellow, quoting from the claim, reads as follows: "a member carried by said rotatable part for rotation therewith and for motion relative thereto in response to centrifugal force." In the portrayal of the Madle Patent in the left-hand panel that part comprises the arcuate shifting weight very clearly shown in Fig. 7 and just barely discernible in Fig. 4, and not shown, of course, in Fig. 6. In the right-hand panel, which depicts Defendant's Model 2500 Engine, it is again the arcuate
225 shifting weight or weighted member colored yellow. And here I would like to point out that this weight in each instance, both in the Madle Patent and in the Defendant's structure, is pivoted to the web of the gear which is the "rotatable part" of the Claim, and which is the element defined in the claim as the rotatable part, and hence, of course, it must move with that cam or that gear. It is also relatively movable with respect to the rotatable part by virtue of the fact that it is pivoted thereto and the relative movement is in response to centrifugal force as was explained by Mr. Harkness during his description of the Madle structure which is illustrated in this Chart. We should also understand that the member referred to in the 9th element of the claim is not just one physical piece of mechanism in either of the two structures, that is, the Madle Patent or the Defendant's structure. In the Madle Patent it is clearly shown by the application of the coloring, it is not only the weighted member but that part which is fixed thereto, and which has a cam surface formed thereon; and in the Defendant's structure that element of the claim finds

response in the weighted element — or the weighted element per se, and the circular ring-like structure which is mounted for rotation on the hub of the gear to which—
226 to which one of the lines leading from the numeral 7 in Fig. 3 is directed. That sleeve or collar is, you might say, connected — not connected but geared to the weighted arcuate member so that they partake of the same motion in response to centrifugal force. Now this exhibit, Plaintiff's Exhibit 21c, is exactly the structure shown in the right-hand panel of the Chart. In Fig. 3. Now, the collar that I was talking about, I am moving slightly off of the hub of the gear upon which it is journaled. Your Honor will notice that there is a tooth projecting from that collar which engages in a notch in the weight so
227 that any response of the weight to centrifugal force, which is outward, away from the axis of rotation, imparts rotation to the collar. If I may have the structure of the Briggs & Stratton engine which is portrayed in the left-hand panel of the chart. The weight, Your Honor, will notice, is very much similar—almost identical in shape to that of the Clinton structure. It happens to be on one side of the gear and the cam, and the portion which that weight moves, and which corresponds to the collar, is on the other side of the face of the gear. Accordingly, the response of the weight, in the Briggs & Stratton structure, Plaintiff's Exhibit 20c, the response of that weight to centrifugal force carries with it that portion on the opposite face of the gear on which the cam surface is located. So in each instance the response of the centrifugal—the centrifugal response of the weight to centrifugal force propels that part of the structure upon which the cam surface is located. The next element of the claim, which is No. 10 and is colored deep blue,

Page of Transcript

is, "a cam surface on said member engaged by said cam
228 follower." That surface is the surface I have just been referring to, which in the Madle structure is on the face of the cam and effects a motion parallel to the axis of rotation, and in the Defendant's structure as shown in the right-hand panel is on the circumference of the collar and effects a motion radially or normal to the axis of rotation. And the claim winds up with the definition or a description that this cam surface is on the member engaged by the cam follower "for imparting motion to the cam follower in said direction once each revolution of the rotatable part to effect breaker point separation at instants depending upon the speed of crankshaft rotation and the position of said member relative to the rotatable part as determined by the centrifugal force acting on said member." And said member, of course, has reference to that part of the structure which is colored yellow. The Defendant's Model 2500 Engine as depicted in the right-hand part of the chart, Plaintiff's Exhibit No. 7, finds full response in the claim in the center panel of the chart.

229 At the outset, as was the case in the Chart which is Plaintiff's Exhibit No. 7, the Chart, Plaintiff's Exhibit No. 5 was made under my supervision by Miss Lois Boehm. I would like to point out that in the projection of this chart, which in the illustrations uses actual photographs as distinguished from original drawings that we employed in the Chart, Exhibit 7, the photographs themselves were taken by Miss Boehm who is quite an accomplished photographer.

The Court: May I have the attention of Mr. Jones. I notice in the pre-trial conference in connection with this Patent you are relying upon the claims 1, 2, 4, 5,

Page of Transcript

6, 7, 8, 14, 15 and 16. I take it this chart really relates to Claim 6.

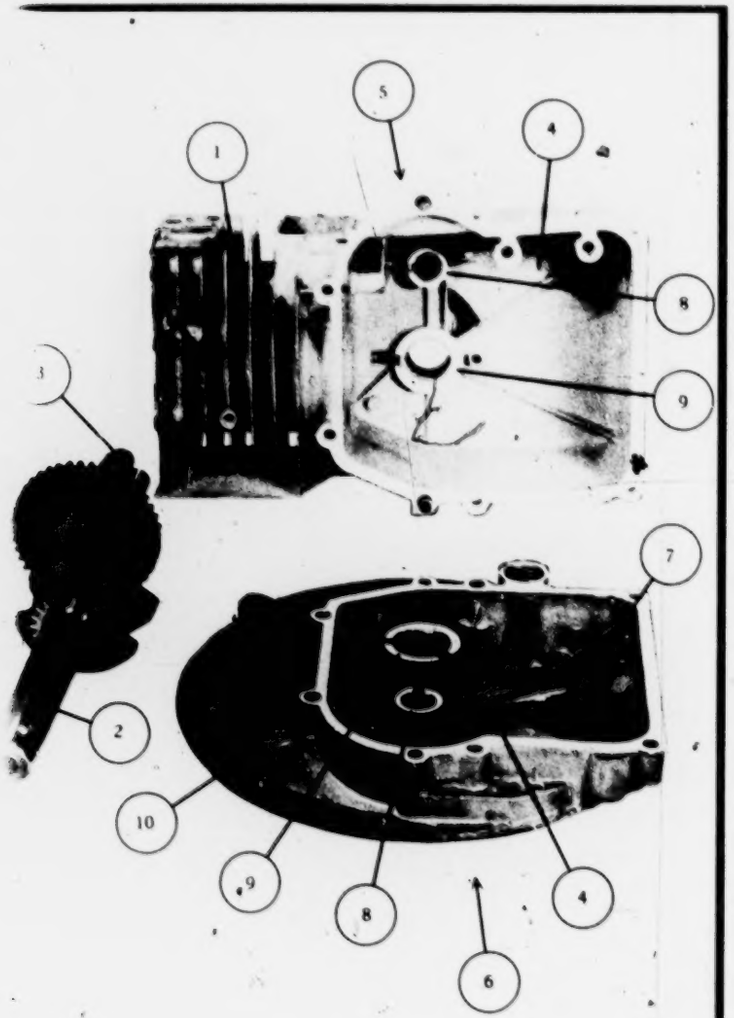
230 *Mr. Jones:* No, Your Honor, I am using that as a typical claim, I will supply the rest of the claims. I am just starting with Claim 6 first because that is the one on the chart.

The Witness:

Now, the actual castings which are indicated in the left-hand panel in Chart, Exhibit No. 5, are photographs which I have said were taken by Miss Boehm of the main cylinder and crankcase of one of the Briggs & Stratton so-called Lechtenberg Engines and the base or cover casting. And to the left of those main castings, which are two castings, is pictured the crankshaft and the crankshaft assembly of that engine. In the right-hand panel there are photographs of the corresponding parts of the Defendant's VS100 Engine, namely, the crankcase, cylinder casting, and the cover or base casting as well as the crankshaft and camshaft assembly. The actual
231 castings of which the photographs were made to provide these reproductions are in Court as exhibits. The purpose of this chart, of course, is to graphically illustrate how the claims of the Lechtenberg Patent 2,693,789 charged to be infringed, apply to the Defendant's VS100 Engine. The Chart, as Mr. Jones, has pointed out, does not attempt to show the application of all of the claims relied upon, but gives only one as the typical example, and that, of course, is the claim 6 in the center panel. The illustration of photographs in the left panel of the chart, Plaintiff's Exhibit 5, are pictures of castings as actually shown in the Lechtenberg Patent '789. And in that connection it might be interesting to know that Miss Boehm also took the pictures, the photographs of the castings that were used in the preparation of the drawings of the

LECHTENBERG PATENT NO. 2,693,789 INFRINGED BY DEFENDANT'S SERIES VS100 ENGINE

PLAINTIFF'S MODEL 6BH ENGINE



TYPICAL LECHTENBERG CLAIM

Claim 6

A single cylinder, four-stroke cycle internal combustion engine adapted for operation with its cylinder horizontal, said engine having in addition to its

1. cylinder
2. a crankshaft,
3. a cam shaft parallel to the crankshaft, and
4. a crankcase with spaced apart top and bottom walls through which the upper and lower ends of the crankshaft pass,

said engine being characterized by the fact that: the cylinder and all portions of the crankcase except its bottom wall through which the lower end of the crankshaft passes is

5. one casting;

by the fact that said bottom wall comprises

6. a cover removably secured to the casting and having
7. a relatively deep depression;

by the fact that the cam shaft is

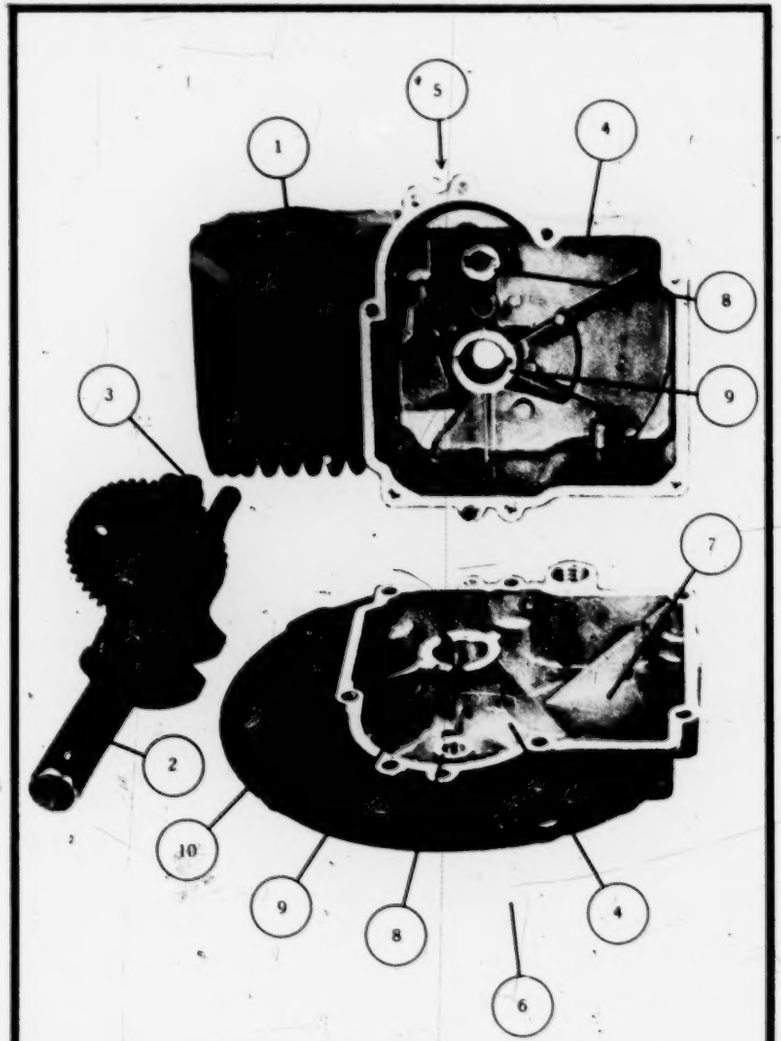
8. supported by the cover and the top wall of the crankcase and the
9. bearings for the crankshaft are in said cover and the top wall of the crankcase;

further by the fact that the depression in the cover provides an oil sump;

and said cover being further characterized by

10. mounting means formed integrally therewith for mounting the engine with its cylinder horizontal.

DEFENDANT'S SERIES VS100 ENGINE



IRA MILTON JONES

Page of Transcript

Patent application and notations from the drawings of the patent application. And she used photographs of actual castings as shown here in the making of those drawings by squeezing them through as we see. There
232 are two ways of doing it, you take the photograph and the photograph is reproduced on relatively thin paper. And then you can blacken the back of the photograph with a soft pencil then with a sharp pencil, tracing the lines of the photographs, squeezing through the photograph much in the nature of carbon copies or much in the way carbon copies are produced, the impression of course, being made directly upon the paper that is used for the carbon of this drawing. That outline is then straightened out and inked in.

Claim 6 of the Lechtenberg Patent '789, which has been selected as typical and which is charged to be infringed, reads: "A single cylinder, four-stroke cycle internal combustion engine adapted for operation with its cylinder horizontal, said engine having in addition to its cylinder" — and the cylinder has been identified by the numeral 1 and a cerise color applied to the element in the claim, and also to the picture of the cylinder por-
233 tion of the main casting in both left-hand and right-hand panels of the chart. Going on with the claim it calls for "a crankshaft." The crankshaft element has been identified by the color blue-green and the numeral 2, and that is readily found in each of these two panels, left and right-hand, designating the crankshaft. The third element of the claim reads: "a camshaft parallel to the crankshaft." That has been identified by the color gray both in the photographs and in the reproduction of the claim. The fourth element which is colored orange reads: "a crankcase with spaced apart top and bottom walls

Page of Transcript

through which the upper and lower ends of the crankshaft pass." Now, that is the box-like structure which I am sure Your Honor has already been able to identify in the physical exhibits that are in Court and is partly and integrally a part of the cylinder casting. The fact that the entire portion of the claim which I have just read all emphasizes the term: said engine having in addition to a cylinder its crankshaft, a camshaft, and the crankcase, with spaced apart top and bottom walls through which the upper and lower ends of the crankshaft pass. Those portions of the engine, of course, are conventional. And now we come into that portion of the claim which recites its characterizing feature. And that
234 is noticed by the language: "said engine being characterized by the fact that: the cylinder and all portions of the crankcase except its bottom wall through which the lower end of the crankshaft passes is one casting." That has been identified by the color — the red color, and is readily understandable not only from the pictures in the chart but from the actual physical exhibits that are in Court and is one of the characterizing features of the invention. It is further, the claim states — that the invention on this engine is further characterized by the fact that the bottom wall comprises a cover having a relatively deep depression removably secured to the casting. That has been identified by the green color and the numeral 6 and is also on the two castings illustrated or depicted in both the left and right-hand panels. That cover which is removably secured to the casting is defined in the claim as having a relatively deep depression, to which the line leading from the numeral 7 to the circle colored brown in both the left and right-hand panels, is directed. The same color brown is applied to the recita-

Page of Transcript

tion of the element in the claim. The claim further carries on with the language — "by the fact that the camshaft is supported by the cover and the top wall of the crankcase." That relationship is depicted in the chart by
235 the comparable color with the lines leading from the colored circle to the wells in the bases shown in the main cylinder crankcase casting and in the cover casting, in both panels of the chart. The characterization of the invention goes on in Claim 6 with the recitation that the bearings for the crankshaft are in said cover and the top wall of the crankcase. And here again both by the numeral 9 and the color yellow we have indicated that the main casting is well as the cover casting provide the bearings for the reception of the crankshaft. And the claim continues with the language — with the characterizing language that the depression in the cover provides an oil sump. That is the reason that the claim defines the cover as having a relatively deep depression. That is the relatively deep depression that provides the sump that contains the oil that lubricates the inside of the engine. The claim concludes with this statement: "said cover being further characterized by mounting means formed integrally therewith for mounting the engine with its cylinder horizontal." To this element of the claim, namely the mounting means, the numeral 10 has been applied as well as the dark blue coloring. And that mounting means in the engine, of course, is the circular
236 flange or disc-like structure which is an integral part of the cover.

Claims 7 and 8 are dependent claims and are both dependent upon claim 6, which is reproduced on the chart. The dependent claim, as Your Honor probably realizes, picks up everything included within it, every-

Page of Transcript

thing of the main claim upon which it is dependent, and merely adds to that main claim features not specifically claimed in the main claim. So in reading a dependent claim both from the standpoint of its principle and conception everything recited in the main claim must be considered along with the elements specifically recited in the dependent claim. There is, of course, no need or point in repeating what has already been said about the application of Claim 6 to the structure of the Lechten-
237 berg Engine and the Defendant's VS100 Engine. So beginning with Claim 7 we find that this claim further amplifies the structure recited in Claim 6, particularly in its definition of the mounting means in that it requires the mounting means which is element 10 in Claim 6 as reproduced on the chart, Exhibit 5, to comprise the substantial circular flange on the cover having a flat downwardly facing rim concentric to the crankshaft axis and adapted to seat upon a flat surface. The element 10 as shown in the left and right-hand panels of the chart does have such a circular flange as indicated by the arrow running from the numeral 10 in the circle which extends to the casting with that circular flange. And although it does not show in the photographs on the chart this flange has a downward facing rim which is concentric to the crankshaft axis, and of course it is adapted to seat upon a flat surface and the entire underside of the rim lies in a common plane. Claim 8 also amplifies the definition of the mounting means recited in claim 6 and does so even more specifically than does Claim 7, since it requires the mounting means to extend from the region of the oil sump toward the cylinder head to thereby enable the mounting means to provide a large mounting
238 area without greatly increasing the outline of the engine.

Page of Transcript

Now, I think it would be well if I could refer to one of the actual cover castings, to better illustrate what we have in mind and I know we had one of the cylinder crankcase castings. As I indicated, the mounting means as it is defined in Defendant's Claim 8 is specifically defined as extending from the region of the oil sump toward the cylinder head. Now, the cylinder head, of course, is applied to the upper end of the cylinder crankcase casting in each of the exhibits 16a and 16c, the former being that of the Briggs & Stratton Engine and the latter that of the Clinton Engine. So the cylinder head would be the upper portion of these physical exhibits, the very extreme top. The casting surface not only
239 has a cover for the main casting but also has the circular flange which provides mounting means as recited in Claim 6 and also in Claim 8 — is the physical exhibit 16b and 16d, and if Your Honor will realize that when these two castings are assembled and brought into proper correlation by virtue of engagement of the dowel pins which project from the open edge of the main casting and enter holes in the front edge of the cover casting, that cover casting will be in such a position that the circular rim which provides mounting means, will extend from the sump portion, which is the depression in the cover casting, toward the cylinder casting, thereby bringing the area occupied by the entire mounting flange substantially within the confines of the area of dimensions of the main cylinder crankcase casting. So that as Claim 8 indicates we have a large mounting area without greatly increasing the outline of the engine, which is important.

Claim 1 of the Lechtenberg Patent -789, referred to before as the first Lechtenberg Patent—May I just point out that the form of this claim is not the ordinary form,

Page of Transcript

240 is not in the ordinary form; that is, in the ordinary form of claim, Your Honor, probably recalls, there is what might be referred to as a catalogue of elements. The structure is defined by a series of elements, one after the other. This claim recites those elements of the Lechtenberg invention—of the Lechtenberg engine which are essential to bringing about or to providing the necessary foundation area that characterizes the invention, consequently the claim is in this rather unusual form. It is not unusual in German and British practice, but is rather of recent form in the U.S. practice. So the claim reads: "A single cylinder internal combustion engine having a crankcase with two spaced apart side walls, each of which carries a crankshaft bearing." The sidewalls of the crankcase in the engine represented by the Exhibits 16a, -d and -c and -e, and which respectively are the Briggs & Stratton Engine and the Clinton Engine. You will notice each of those side walls carries a crankshaft bearing. The relationship that I have already expressed, that of a crankcase having spaced apart sidewalls is, of course, depicted and shown in the chart by virtue of its
241 illustration of the main cylinder and crankcase and the cover casting, one above the other in each of the two opposite side panels. The claim continues: "A cylinder" — and this is still referring to the element that the internal combustion engine has — "a cylinder and a crankshaft journaled in the bearings with its ends projecting from the crankcase." The cylinder, of course, on the chart is identified by the numeral 1, and the crankcase by the numeral 2. The ends of the crankshaft are adapted to protrude both above and below the crankcase when that crankcase is arranged with its cylinder horizontal. The claim continues: "One end of the crankshaft having

Page of Transcript

a flywheel mounted thereon, and the other end being the power take-off end of the shaft." That, of course, is the conventional construction, one end of the crankshaft, the flywheel is attached to it, and the other end constitutes the power take-off end. And in the engines we are here concerned with, if the cylinder is horizontal and the crankshaft vertical, it is the upper end of the crankshaft which carries the flywheel, and the lower end constitutes the power take-off end. Now, the claim goes on to state, that, "the cylinder and all portions of the crankcase including the wall thereof remote from and facing the cylinder, except that wall of the crankcase
242 which carries the bearing for the power take-off end of the crankshaft is a single casting." That fact is also expressly in Claim 6 and is identified by the numeral 5 and the red color and, of course, it is found in the upper pictures or photographs in the right and left-hand panel. The Claim goes on to say that the engine is – that the invention is further characterized by the fact that "said wall of the crankcase which carries the bearing for the power take-off end of the crankshaft is provided by a cover removably secured to said casting." Now, that cover is the element 6 of Claim 6 and is identified by the green color in the chart. Now, the Claim concludes with the statement which seems to me is all important, and that is, that "said cover is interchangeable with others of different design to adapt the engine to any of a variety of different installations without necessitating alteration of the cylinder-crankcase casting." And that is characteristic of the Lechtenberg Engine and as well as for the Defendant's VS100 Engine. And in my estimation this characterizes the difference in the engine from what went on before. It is the thing that has made possible

Page of Transcript

the accumulation of all of the constants — all of those parts of the complete engine which do not change from
243 one adaptation to another, all in the one main cylinder crankcase casting, which is the most expensive part and most expensive to produce, all of this constantly in that one engine, and all of the variants needed to adapt the engine to a wide variety of appliances.

Claim 2 is directed to the same general structural relationship set out in Claim 1, but in more specific language, and applies to the Defendant's VS100 Engine as follows: The claim calls for "A single cylinder, four-stroke cycle internal combustion engine having a crankshaft" — which, of course, every engine has — "a camshaft parallel to the crankshaft." That preliminary relationship between crankshaft and camshaft is, of course, present in the Defendant's VS100 Engine. The claim goes on with a recitation of a cylinder and a crankcase — which all engines have — "through opposite walls of which" — and "which" has reference to the crankcase — "the ends of the crankshaft pass." That relationship is
244 obviously present in the Clinton VS100 Engine. "One end of the crankshaft having a flywheel thereon and the other end being the power take-off end of the crankshaft." That, as brought out in connection with Claim 1, is the relationship in the Clinton Engine as well as it is in the Lechtenberg Engine, the flywheel being at the upper end of the crankshaft when the engine is operating with its cylinder horizontal and the power take-off end of the crankshaft being directed downwardly. The main characterization of the claim now continues with the language defining "the cylinder and all portions of the crankcase including the wall thereof remote from and facing the cylinder, except that wall of the crankcase

Page of Transcript

through which the power take-off end of the crankshaft passes is one casting." That is a factor present in the Clinton VS100 as well as it is in the Lechtenberg Engine. The claim then goes on to say that the wall "through which the power take-off end of the crankcase passes is provided by a cover removably secured to said casting." And that is the removable cover 6 in the chart to which the color green has been applied; and by chart I have reference to Plaintiff's Exhibit 5. The claim goes on to say that the invention is characterized "by the fact that
245 the crankshaft and the camshaft are supported by said cover and the wall of the casting opposite the cover; and by the fact that the supports for the camshaft comprise wells in the cover and said opposite wall of the casting." These two features are definitely present in the Clinton VS100 Engine, and is a last feature or element of the claim which identifies the supports for the camshaft which are known as wells, which will be seen in the line which has the purple colored circle No. 8 in both the left and right-hand panels of the chart, and extends to the top wall and is a boss which is drilled and is provided with a downwardly extending wall upon which it is attached.

Claim 4 is another one of those dependent claims. It is dependent upon Claim 2, so that all of the structure recited in Claim 2 is a part of Claim 4. But Claim 4 further identifies the invention by stating that it is "characterized by the fact that said cover has a relatively deep depression in its inner face so that when the engine is positioned to operate with its cylinder horizontal and said cover at the bottom of the engine, the depression in its inner face provides an oil sump." It has the same structural relationship which is expressed in Claim 6

and is depicted on the chart by the color brown — the
246 brown color applied to the claim 6 and also to the photograph. The claim further characterizes the structure previously recited in Claim 2 by stating that the cover has a boss projecting from its inner face and bored—that is, the boss is bored through to provide a bearing for the adjacent end of the crankshaft. The claim continues: "Said boss extending for substantially the full depth of the depression in the cover so that oil in the depression rising to a level substantially equal to the full depth of the depression, when the engine is used with its cylinder horizontal, will not drain out along the crankshaft when the engine is idle." That boss is the portion depicted in the Chart, Plaintiff's Exhibit 5, to which the line leading from the numeral 9 leads, and which in the chart is identified by the yellow color. Perhaps it is not clear from the chart alone, but it is a fact, as evident from an examination of Plaintiff's Exhibit 17b that the top of that boss which has just been referred to and which provides the bearing for the lower end of the crankshaft, is on a common plane with the edge of the depression. It is also true of the Defendant's cover which is in evidence as Plaintiff's Exhibit 16d.

247 Claim 5, after it recites the usual complement of structure and elements of an internal combustion engine, and by that I mean you supply — the crankshaft, the camshaft, and the crankcase, it goes on to characterize the structure in this language: "That all portions of the crankcase except its bottom wall through which the lower end of the crankshaft passes is one casting." That has already been established as being a fact in the VS100 Clinton Engine as well as in the Lechtenberg Engine. The Claim continues with this definition of the structure:

Page of Transcript

"By the fact that the bottom wall" — and we here have reference to the bottom wall of a crankcase — "comprises a cover having a relatively deep depression removably secured to the casting with the edge of the depression joining the casting on a plane parallel to said top and bottom walls of the crankcase and below the cylinder, by the fact that the camshaft is supported by the cover and the top wall of the crankcase and the bearings for the crankshaft are in said cover and the top wall of the crankcase." Its structural relationship also has been definitely shown to be present in the Defendant's VS100
248 Engine as that is depicted for instance in the right-hand panel of the Chart, Plaintiff's Exhibit 5. The Claim also defines the structure by this characterization, namely, that "the depression in the cover provides an oil sump and has an oil filler port therein communicating the depression below the top edge thereof with the mouth of the filler port on a level no higher than the edge of the depression so that the level of the oil in the sump will not be above the edge of the depression." The oil filler port to which the claim refers, is easily seen — readily seen in the pictures of the cover casting in the left and right-hand panels of the Chart, and is the threaded opening at the upper edge portion of the cover casting depression as that is portrayed in the pictures in the left and right-hand panel of the Chart, and in the physical exhibits 15b and 16d respectively. The filler is at the left of those physical exhibits as they appear on the panel in the courtroom. The top of those filler portions is an extension of the upper edge of the depression, and for this reason the oil poured into the filling port all the way to the top thereof will not be at an elevation inside of the sump higher than the top edge or opened edge

Page of Transcript

249 of the depression, which of course fits against the adjacent side of the main cylinder crankcase casting and is sealed thereto by a gasket. The claim further continues: "said cover being further characterized by a pair of bosses projecting up from the bottom of its depression, one of said bosses being bored through and providing the bearing for the lower end of the crankshaft, and the other boss having a well, closed at its bottom extending down into it and providing a support for the lower end of the camshaft." These bosses are identified in the Chart by the numerals 8 and 9. Boss 8 provides a support for the camshaft and though not evident from the illustration and the chart, is closed at the bottom, as can be ascertained by reference to the physical exhibit 16b and 16d. The Claim concludes with the statement that "the boss providing the lower crankshaft bearing extending substantially to the level of the edge of the depression in the cover so that when the engine is idle the oil in the sump will not be drained therefrom through said crankshaft bearing." That relationship has already been described in previous claims and is obviously present in the Clinton VS100 Engine as well as in the Lechtenberg Engine.

Claim 14 I believe is the next up. This claim is con-
250 cerned with another aspect of the Lechtenberg invention. It reads: "In an engine of the character described: a cylinder and a crankcase formed as one casting, the crankcase being open at its bottom." That element of the claim is, of course, the communicating cylinder and crankcase of the Clinton Engine and also of the Lechtenberg Engine. Going on with the claim we find it calls for "a cover closing the open bottom of the crankcase, said cover having a depression therein providing an oil

Page of Transcript

sump for the engine." Now, here we find the structure of the cover being defined so as to provide a relatively deep depression, which is clearly portrayed in the chart. The claim continues with the recitation: "Bearings for the crankshaft of the engine carried by the cover and the wall of the crankcase opposite the cover." In the Chart these bearings are identified by the numeral 9 and the color yellow. The claim continues with the recitation that the cover has "an oil filler port provided by a well extending down from the top of the cover alongside the depression in the cover," and states that "the top of said well providing the mouth of the port and lying substantially on a plane with the top edge of the depression." This same filler port, called for in Claim 5 and which in the illustrations of the Chart appears as
251 having the internal thread at the back or upper wall of the — of the cover — of the box. The claim further defines the cover as "having an oil drain port in its bottom provided by a bore parallel to the oil filler port but lying between said port and the adjacent wall of the depression." It might be well to identify these elements of the claim by reference to the numerals of the Lechtenberg Patent '789. The oil filler port is designated by the numeral 35 in Fig. 5 on sheet 4 of the drawing. And also in Fig. 9 on the same sheet of the drawings. The drain port called for by the Claim is identified by the figure 36 and can be found in Fig. 9 on sheet 4 of the Lechtenberg Patent drawings. The Claim states that the oil drain port lies between the filler port and the adjacent wall of the depression. And this relationship, though illustrated in Fig. 9 of the Lechtenberg drawing, is perhaps better appreciated by reference to the physical Exhibits 16b and 16d. The Claim further provides that the drain

port communicates with the filler port to thereby communicate the filler port with the interior of the depression. In other words, the claim sets out the relationship whereby the drain port extending upwardly from the underside of the cover casting between the filler port and
252 the depression which provides the oil sump establishes communication between these two, that is, between the oil filler port and the depression or sump. And the claim winds up the recitation of the removable caps for closing both the oil filler port and said oil drain port.

Claim 15 is dependent upon Claim 14 and defines over and above Claim 14 by calling for "the provision of a boss projecting from the bottom of the depression in the cover, said boss being bored through and providing the bearing for the lower end of the crankshaft and having a height to reach substantially to the level of the mouth of the filler port so that oil in the sump can not drain out through the lower crankshaft bearing when the engine is idle." That relationship of the boss which provides a bearing for the lower end of the crankshaft, has already been discussed and it is clearly evident in the photographs on the Chart and also in physical Exhibits 15b and 15d.

Claim 16 is an independent claim and reads: "A single cylinder, four-stroke cycle internal combustion engine having a crankshaft," — and I might shorten it by saying it calls for the usual elements of the
253 engine, the commercial engine, and then goes on to say that the engine is characterized by the fact that it is so designed to be used with its cylinder horizontal, with a crankshaft passage provided through the top and bottom walls of the crankcase. So that the flywheel is ad-

Page of Transcript

jacent to the top wall and the power end of the crankshaft projecting downward from the bottom wall. And further "by the fact that the cylinder and all portions of the crankcase including the wall thereof remote from and facing the cylinder, except the bottom wall through which the power take-off end of the crankshaft passes is one integral casting." This structural relationship expressed in the claim thus far clearly finds response in the Clinton VS100 Engine. The claim continues with the recitation that the "bottom wall is provided by a cover removably secured to said casting," which fact has also been satisfactorily established. Then the claim goes on to state that "the crankshaft and the camshaft are supported by said cover and the top wall of the crankcase." This structural relationship in the Clinton VS100 Engine is also clearly present, as reference to the right-hand panel in Chart, Exhibit 5, will show. The claim further states that the cover "has a relatively deep upward opening depression which provides an oil sump,"
254 a fact already established. And concludes with the characterization that "the cover has a boss projecting upwardly from its inner face and bored through to provide a bearing in which the lower end of the crankshaft is rotatably supported"; which is a fact in the Clinton VS100 Engine, as well as in the Lechtenberg Engine, and states that said boss extends "for substantially the full depth of the depression in the cover so that oil in the depression rising to a level equal to the full depth of the depression will not drain out along the crankshaft when the engine is idle." And that relationship has already been shown to exist in the Clinton VS100 Engine.

The Clinton Engine, as represented by Plaintiff's Exhibit 13 and as represented by Exhibits 16c and 16d and

Page of Transcript

by 18a, does find a full and complete response to each of those claims 1, 2, 4, 5, 6, 7, 8, 14, 15 and 16 of the Lechtenberg Patent 2,693,789.

* * *

274 *Cross Examination*

292 The two contacts of the Madle Patent are defined in
293 Figure 4 by the numeral 30, which designates the stationary contact, and by the numeral 29, which is the specific point of the Madle contact, but which actually is part of the arm, or fixed solidly thereto, the arm 28, so that together the arm 28 and the point 29 in my estimation constitute the movable contact. So I consider the part that Madle calls his contact carrying arm the contact. I think we have perfect liberty to do that, because when you buy a set of points for your automobile ignition system you don't get just the specific tips. In interpreting that claim I have not departed from the specification to such an extent as to preclude it. I wouldn't say that I was departing from the specification as written in that patent. You have a contact designated by the numeral 29 in Fig. 4, and you have got a contact carrying arm 28. Now, I say the arm and the contact make the contact here. In that respect I wouldn't say
294 it was departing from the specification.

Pointing out the elements of the Madle disclosure which are embodied in claim 5, without using the chart —The first specifically recited elements are introduced in the claim by the language: "Fixed and movable breaker points accessibly mounted on the exterior of the engine remote from the magneto." Now, those parts are the contacts 28 and 29 and my interpretation includes the
295 arm. The part designated 30 in Figure 4, and the parts designated 29 and 28. Going on, the claim next specifies:

Page of Transcript

"a cam follower movably supported by the engine remote from the breaker points." That you can probably see better in Fig. 6. The cam follower has the numeral 36 applied directly to it, and that portion of 36 which actually rides on the cam is a part of the member 35, and to establish the definition with relation to its mounting I think the claim states that—yes, the "cam follower movably supported by the engine remote from the breaker points," which, of course, it has. It is movably supported, and it is remote from the breaker points; and this I consider a very essential element or portion of the claim, this remoteness in the location of the cam follower and the breaker points—. The next element is "a motion transmitting connection between the cam follower and the movable breaker point such that separation of the points is effected by motion of the cam follower in one direction." Now, that connection is the shaft 27 which connects the cam follower comprising the
296 arm 35 and the extremity thereof, 36. I am looking at Figure 4 particularly. You will notice that shaft 27, as I have said has the arm 35 securely fastened to it at its right-hand end; and at its left-hand end has the movable contact comprising the arm 28 and the point 29 fixed to it, so that by virtue of this shaft 27 you have a connection between the cam follower and the movable breaker point. And because of that connection motion of the cam follower in one direction will effect motion in the same direction on the part of the movable breaker point.
297 Because the cam follower is fastened to the shaft 27 and the structure is so arranged that the cam-produced motion of the cam follower imparts rotation to the shaft 27, and because the movable breaker contact is also secured to the shaft 27 it will partake—I mean, the movable

breaker contact will partake of such circulatory motion of the shaft in the same direction as the movement of
298 the movable cam follower. The next element of the claim is "a rotatable part adjacent to said cam follower." That rotatable part is the large gear 38 in the Madle Patent drawings,—. And when I apply that claim to Plaintiff's structure I apply that claim to mean this gear, and all portions thereof. This shaft sticking out from the side is not a gear in the sense its function is not part of the mounting the gear, it has nothing to do with the gear. The next element of the claim is "a driving connection between said rotatable part and the engine crankshaft whereby the speed of rotation of the crankshaft
299 determines the speed of rotation of said rotatable part." The driving connection, of course, is provided by the meshing gears, or more specifically by the teeth upon the gears 38 and 39 in the Madle drawings. The next element of the claim, "a member carried by said rotatable part for rotation therewith and for motion relative thereto in response to centrifugal force," in the Madle Patent is identified by the numeral 45 in Figure 7, and all parts fixed to that member 45, which in Figure 7 is shown to have a crescent-shape, so that all parts of that member and that structure, or separate parts connected to it, move in response to centrifugal force. The member carried by the rotatable part is identified as the weight 45 and all of the structure fixed or connected or secured to it. I have particular reference to the rather arcuate-shaped piece of metal which is secured to the weight medially of the ends of the weight, and overlies that face of the web of the gear opposite that at which the weight
300 proper is located, and it has a stop and bumps formed on it to limit the motion of the assembly comprising the

Page of Transcript

weight 45 and this piece of metal fixed to it to predetermined limits. And this particular piece of metal 37 or the numeral 37, is applied to it in Figure 8, also of course, has the cam surfaces formed on it. The part having stops is the cam plate 37. We are now down in the part of that claim to this conclusion, that the member carried by the rotatable part means the weight 45 and the cam plate 37. That is the movable member that is secured together. The next element of the claim, "a cam surface on said member engaged by said cam follower for imparting motion to the cam follower in said direction once each revolution of the rotatable part to effect breaker point separation at instants depending upon the speed of the crankshaft rotation and the position of said member relative to the rotatable part as determined
301 by the centrifugal force acting on said member." Now, the cam surface is the inclined face of the plate 37 to which in Figure 6 the numeral 37 double prime is directed. That is the cam surface, or is part of it. That actually is identified in Claim 7 of the specification as the trailing end of the cam. And the leading end by the numeral 37 prime. In other words there is an incline up and a decline down to the surface. And both of those inclines are the cam surfaces called for in the claim.

Examining Defendant's Exhibit D-14, the shaft, of course, is formed of an entirely different metal than the gear. It has been apparently press-fitted into the gear. And while, therefore, prior to assembling it is not part of the gear, in the end result the total assembly is a part of the gear for some purposes, in my estimation, making this observation: in the absence of the projection of the shaft from the smooth face of the gear there would be no boss to space the gear from an adjacent operating end,

Page of Transcript

and that, of course, such would not be necessary
302 but it might be necessary. The short end of the shaft projecting from one face of the gear in Defendant's Exhibit D-14, in one sense forms part of the gear and in another sense does not. It is not the same metal as the gear. Functionally it might be part of the gear. I think it depends upon the purpose of the consideration. In what sense are we speaking? I doubt if you can place, upon the testimony I have given, the inference that when you consider the Plaintiff's construction, the shaft does not form a part of the gear, but when you are considering the Defendant's construction the shaft does form a part of the gear. Would
303 it make any difference if the whole were carved out of one metal? I don't think so, and particularly not functionally, as the function of the rotatable part called for in the claim requires interpretation of that element. I
304 think my testimony with regard to the Briggs & Stratton, the one was as I applied the element, the "rotatable part" of the disclosure of the Madle Patent, that it was the gear and all parts thereof which would, of course, include the hub of that gear, and whether that hub was made as an integral part of the casting or a separate piece secured to it, it is none the less a part of the gear and a part of the rotatable part. And I think I was careful to say that the member carried by the rotatable part in the Madle Patent and in the Briggs & Stratton structure is the weight and the piece of metal—that arcuate piece of metal which has the cam surface mounted on it. They are two separate pieces that have been solidly secured together and as a result they constitute—move
305 in unison in response to centrifugal force. And in the defendant's construction exemplified by Plaintiff's Ex-

Page of Transcript

hibit 21c, the member which is carried by the rotatable part is the weight and the collar which is rotatably supported by the hub portion of the gear. These two elements are joined together in such a way that they are constrained in the operative condition of the mechanism to move in unison in response to centrifugal force. The cam surface is not upon the weight in the Madle construction, but is on a part connected to the weight, and in the Defendant's construction the cam surface is on a part, specifically the collar journaled on the hub of
306 the gear which is connected to the weight. In the physical Exhibit Plaintiff's Exhibit 21c, that member is the weight plus the collar which is mounted on the boss. You may call the collar the cam gear's sleeve, if you like; I call it the hub of the gear. Together they comprise the member, and together, of course, they rotate with the gear which is the rotatable part, and also they
307 are both movable in response to centrifugal force. They are also both movable in response to centrifugal force; and I think, before, I pointed out they were so connected that they were constrained to move together in response to centrifugal force. Centrifugal force acts upon any object having a mass rotating about a defined axis, and it acts outwardly from that axis. And when it flies off tangentially that is, the mass would move out tangentially. The phrase is, I think, outwardly. It is a force moving outwardly, tending to move weights away from the center. I do not say this cam member, sleeve or collar as you call it, responds to centrifugal force. I say that together with and by virtue of its connection to the weight, it must respond to it, it must move. In the light
308 of that statement I do not want to change my statement that sleeve or collar responds to centrifugal force, but

Page of Transcript

I would like to add to it. I would like to point out that the motion which is imparted by centrifugal force to the collar is arcuate, rotatable about the axis of rotation, and so is the force which is applied to that member of the Plaintiff's structure upon which the cam surface is located. There is functioning in Plaintiff's Exhibit 21c
309 a force which brings about rotation of this collar or sleeve, other than the force that I have been talking about—the spring. In one direction, opposed to that produced by centrifugal force. And friction may be tending to rotate that sleeve or collar in the other direction. Friction is not a moving force.

In the Lechtenberg Patent '789, Claim 1, the subject matter of the first nine lines, down to the colon, cannot be disregarded in determining if the claim is satisfied by any given structure, whether we approach the question from the standpoint of anticipation or infringement. There-
310 fore, it is part of the claimed structure. I don't believe there is any intention that cooperative relationship between the flywheel and the crankcase should be expressed or inferred.

Claim 4 depends upon Claim 2. Claim 2 has a relationship to Claim 1. The elements set out in the first seven lines of Claim 2, down to the colon, are a part of the claimed structure to the extent that the recitation
311 of those elements is essential for completeness and for the sake of understanding, so that the structure thereafter following in the claim can be properly coordinated to a complete unit. That coordinated part of the claimed invention appears in Claim 2. The subject matter of the first seven lines of Claim 5, ending at the colon in line 8, is a part of the claimed structure, but when you introduce that in the claimed invention that perhaps induces another question. You write a claim to define the in-

Page of Transcript

vention and distinguish it from prior art, so that those concerned with the question of whether or not they infringe the patent can determine that question. And you
312 have an introductory clause in practically all of these claims setting out practically the same parts, that is part of the claimed structure in those other claims, too, as it is needed for antecedent purposes. Wouldn't it be obvious that the recitation of that structure, which in itself
313 may be without characterization, would be meaningless? It is an essential part of the claim in the sense that the claim attempts and does define the invention and although the recitations of those structural elements is necessary for the claim to properly characterize what the invention is.

The Court: As I understand it, it doesn't mean what is stated therein constitutes the invention.

The Witness:

That's right. This is not a conventional type of claim, as I said on Direct Examination, and which I think you recognize. The invention in this particular case is in the—real invention is not susceptible to the convention claim—to definition by a conventional claim as well as it is by a "characterized by" type of claim—. I don't mean you cannot point out a distinguishing claim of invention.

314 Now, in Claim 1 I said forming a part of the claim was a single cylinder internal combustion engine having a crankcase with two spaced-apart sidewalls. That is not part of the Lechtenberg invention. A recitation of that structure is essential to a definition of the Lechtenberg invention. I think the Lechtenberg invention is very aptly expressed in Claim 1, wherein it is stated and defined that the invention—the real invention here involves or rather consists in the concept that the unitary

Page of Transcript

315 cylinder and crankcase casting—the one piece cylinder and crankcase casting, which the claim defines as including all walls of the crankcase save that wall, all except that wall, through which the power take-off end of the crankshaft extends, is one integral casting, and that the remaining wall of the crankcase is provided by a cover casting, and that by virtue of its relationship—its structural relationship, all of the constants of the engine—all of those parts of the engine which form one adaptation or use or purpose to another are embodied in the one unitary main cylinder crankcase casting. Then all of the variables which add—which form one adaptation or use of the engine to another, are and can be incorporated and embodied in a far less expensive cover casting. The thing I am trying to state, Your Honor, is that we have one main diecasting, which in itself includes—

316 *The Court:* Is the one unitary casting—integral casting, involved in the invention?

The Witness:

No, not that; but arranging that casting in such a way or, rather, constructing it in such a way that the line of separation between it and the cover casting occurs where it does so that the power take-off end of the crankshaft protrudes through the cover casting, and all of the rest of the engine is carried by and is mounted on the more expensive unitary cylinder crankcase casting. It is that concept which enabled Lechtenberg to achieve, and it gave Lechtenberg the invention from which all of these unexpected new results, from which all of these unexpected advantages flow.

Prior to the filing of the Lechtenberg Patent there were crankcases and cylinders cast as an integral unit.

Page of Transcript

And in those engines one side wall of the crankcase was open, as shown in Defendant's Exhibit D-9. And that
317 side was closed by a cover plate. Now, that cover plate could be removed from the crankcase without disturbing the internal mountings of the structure therein. And if you desired you could replace that cover plate with a different size or shape of cover plate as long as you had the necessary bolt holes located for securing it on the crankcase wall. But that is not the invention claimed.

Q. That is true. Just answer the question. That you and Lechtenberg knew all about before filing the Lechtenberg application resulting in Patent No. '789, but instead of cutting off the side wall of the crankcase directly opposite the cylinder, to close that with a cover plate you cut off one of the other sidewalls and left this wall directly facing the cylinder integral with the crankcase. Now, that was the change that was made, wasn't it?

A. Not just one of the other side walls.

Q. That was the change that was made, wasn't it?

318 A. I cannot answer that yes or no, not just one of the sidewalls, but the side wall through which the crankshaft entered the—. I will agree that instead of having the side of the crankcase directly opposite the cylinder open, that side was made closed and the side of the crankcase through which the power take-off end of the crankshaft projected, was left open, and enclosed by a cover plate.

* * *

328 DEPOSITION OF ARTHUR J. EATON

Mr. Jones: I stipulate that this man purchased the lawn mower, Exhibit D-2, from the Baldwin Hardware Company in April, 1948.

The Witness: I have been using that since.

• • •

330 DEPOSITION OF GEORGE ROSE

Direct Examination

George Rose, 53 Sand Lake, Onsted Michigan. Age 33, occupation, Superintendent in Die Cast. Engaged in die cast work since 1937. My duties as Superintendent of the Die Casting plant here are to take and get production out, design dies, help design dies, to make particular castings which we want. I am now working for Clinton Machine Co. I have been engaged in the
331 die casting business since 1937. I know die casting from A to Z. I run the machine; I file the castings. I process them. I have worked as a tool and die worker—I mean I did everything as far as the die casting industry goes. I have been in the die casting work since the latter part of 1936 and 1937. I started out as a common laborer, I mean, filing castings. I worked my way up.

I have seen a structure like Exhibit D-3 before. You
332 see, I went to work at PEMCO. That's the pen name for Product Engineering and Manufacturing Corporation. I was Superintendent, well, general foreman and later Superintendent in their Die Cast Department and we run this job there. That is located in Bridgman, Michigan. I went to work for them, I believe, in the latter part of 1950. The only way I can fix it is 1951, I bought a new car while I was working there and in 1949, well, 1950, we had a bad strike at the Benton

Page of Transcript

Harbor Malleable Industries, and that's where I got tied up with Bridgman. They had run this Exhibit D-3 prior to my time of coming there. The die was going in and out of the machine. Actually, it was 1951 when I
333 actually run it myself or had it run, set up and run. When they were run at the plant at Bridgman, Michigan, they were sent to Pioneer, General Motors. I would be sort of guessing, but I am positive it was in Chicago. We always called it an oil pan. On a lawn mower — the
334 little motor on a lawn mower. On the engine for a lawn
335 mower. The name of the company that these bases, such as shown in Defendant's Exhibit D-3, were shipped to was Pioneer, Gen-E-Motors Corporation, in Chicago. Have I ever seen an engine with that kind of a base on it? Well, I actually really can't say yes or no to that. I think I have. I mean if I flatly stated that I did, I wouldn't be positive. There is a base on that engine Defendant's Exhibit D-2 corresponding to the structure of Defendant's Exhibit D-3. It is the same thing. I would say that it was identically the same as this. I have examined Defendant's Exhibit D-1, and I find there a base corresponding to Defendant's Exhibit D-3. I would say it is identical to that. Page 20 of Defendant's Exhibit D-4 and particularly, the part which is numbered 60-206, resembles the structure shown in Defendant's Exhibit D-3. The same thing. When I was working at the plant there in Bridgman, running die casting such as Defendant's Exhibit D-3, they were running a similar structure with modifications. They had a similar casting as this, refer-
337 ring to Defendant's Exhibit D-3. They had a similar casting to this, which, after I was there for a while, found out that it supplemented this. In other words, it was a little longer, a little narrower, practically the same

thing. By "this", I mean Defendant's Exhibit D-3. The only thing it differed, it was longer this way (indicating): It was shallower. It only came about thusly. This core (indicating) was here in the center (indicating). It came out h e (indicating). It was practically the same thing, only easier to run, I would say. This core (indicating) comes through. It was used as a ratchet and this core was practically like this (indicating). It
338 was all automatic. The core that I was referring to was this core here (indicating). It comes out of the die here and this core here (indicating) was a rack out deal that come through the ejector part. Well, it is a core that comes down through here (indicating). It is long and in order to pull it on this angle, it has to be — to get it out — it had to be hand operated, which made the casting rather hard to run, but what it did, it saved an operation, as far as the cleaning was concerned. That core formed a passage after the die was cast. Actually, the goldarned thing is right vertically to the base of the structure which is Defendant's Exhibit D-3. Now,
339 the core that I referred to is at one side of the structure, D-3. It will come vertically with this surface which I term the top. In the illustration, identified as 60206, appearing in Defendant's Exhibit D-4, there is a similar core on that structure. It looks like that extends at the same angle as the core on Defendant's Exhibit D-3 ex-
340 tends. In this Defendant's Exhibit D-3, you have a passage extending downwardly from one side, the upper end of which is threaded. Those three are not present when the structure is cast. They are machined in afterwards. You also have on one side of the structure an opening which is threaded. That opening is used probably to fill it with oil or drain it. This passage which

Page of Transcript

extends along one side wall breaks through the side
341 wall at the bottom. That is accomplished through this core coming down from this angle and kissing off, touching this core here (indicating) and sealing it off, not leaving any metal get through here, and when this core is pulled, this is ejected off of the large core. You have got an opening. Considering the open side of this structure the top side, and the closed side, the bottom, this core extending angularly downwardly extends from the top to the bottom. Also, you have a core coming
342 in here (indicating). It is right vertically with the bottom. It goes through the bottom. In forming that opening, it was formed by means of a core. Now, you had a passage coming up through the bottom or a core coming up through the bottom to form an opening and you had another core running diagonally downwardly from the top. Those cores when they were in position prior to casting, are interlocked. They are sealed right off. They are right together. They contact each other.

Defining the term "kissing core", whenever you want
343 something to seal off, not have any metal or any flash around it, well, we bring the cores up and kiss them together so they are right. I mean contact them togeth This structure shown in Defendant's Exhibit D 3 w pro-vided with kissing cores to form these passages that we have been talking about. In Exhibit D-5 I find evidence that when it was cast, kissing cores were used. In that
344 structure, the cup portion is in the ejector die. And it is a core. It is a round place that fits right down in here (indicating). And then, there is another core this way (indicating). Coming in from the bottom and on the side of the structure. And that comes down in there and just rides on this portion here (indicating), just enough

so that it won't gall, and enough so that the metal will not fill in there, leaving an opening. It is a common practice in die casting to use kissing cores in order to establish a communication between the two passages. We have used it ever since I have been in it. I mean, in dies that were made before I even got into the die casting end and knew exactly the finer points. It was used previously to that. It has been used ever since I can remember. That was commonly used when I went to work for that Bridgman Company in 1950. It was com-
345 mon practice at that time. This die had been running before I even came there because I used to squawk about it. I am speaking now about Defendant's Exhibit D-3.

• • •

347 Now, in Defendant's Exhibit D-6 there is a communication between that filler opening and the drain opening. That was formed by the use of cores coming together and sealing off. They will come right in there and kiss off and seal. It is the use of three cores. We had kissing cores to form that structure. That practice of forming that communication is practically the same thing as the practice used in constructing Exhibit D-5.

• • •

349 When we are making a die cast out of aluminum and we are casting a boss projecting upwardly from the base,
350 it is customary to reenforce that boss with those ribs. Actually, what happens on these goldarned things, if you don't have these reenforcing ribs, you leave this in the die. It is hard to cast and you would have to have some support on this darn thing. When I speak of this "darn thing", I am speaking of this boss that is projecting from the base. Now, projecting from the side walls of Defendant's Exhibit D-6, you have ribs. Those

Page of Transcript

are used for reenforcement purposes or other purposes, to the best of my knowledge.

* * *

CLARENCE DAMON

Direct Examination

352 My name is Clarence Damon, 36 years old, I live in Tecumseh, Michigan, I am Assistant to the Chief Engineer of the Clinton Machine Company. I started working for the Clinton Machine Company in 1946. I stayed
353 there a few months, left, and returned in 1950, and continued there until — I am still there. My work varies widely from designing, follow-up, expedited drawings, even running blueprint machines occasionally, everything during the time I have been there, along with contacting die makers for die cast pattern makers, sand cast foundries, machine shops for machining, assembly problems, coordination of engineering of new products— I should say, with the production lines over in Maquoketa through our developments in Michigan. There is a multiplicity, they are hard to cover all at one time.

I know what is meant by the VS700 put out by the Defendant. I have seen that circular Defendant's Exhibit D-17 before. I have seen this particular circular as far back as my second employment with the company, 1950. It is the VS700 Engine. There was several different metals
354 in it, cast aluminum, die cast zinc, sand cast castings, iron blocks, steel stampings, there were plastics, rubber, many different materials in it. How many do you want to cover? We have a VS700 here. That is the same engine, except this is a later date. The one Clinton made in 1950, I don't know where it is, but that is it right there, D-8. D-8 is the same structure generally as the machine shown on Defendant's Exhibit D-17.

Page of Transcript

355 I am acquainted with the vertical shaft engine, which the Defendant, Clinton Machine Company, put out under the name of VS300. I have seen sheets like Defendant's Exhibit D-18 before. At Clinton Machine Company, Clinton, Michigan. There has been some changing in the face and coloring, and so forth, of the brochure sheet, but this one was issued in 1952, but the 300 engine goes back into 1950, I am positive. We have some older brochure sheets somewhere, but this is the newer brochure sheets. As far as I know, those sheets such as shown there, Exhibit D-18, circulated to the
356 trade as early as 1950. Clinton Machine Company manufactured and sold an engine VS300, such as illustrated in Defendant's Exhibit D-18. I have one at home on my lawnmower. The 300 was a smaller, lower horsepower than the VS700. It had a cast iron sump and mounting flange. It had an aluminum bearing plate, two separate cam gears, with tubes mounted in the aluminum bearings of the bearing plate — die cast aluminum bearing plate, incidentally. Let's see. It had a steel cover in the back instead of the aluminum cover as the
357 VS700 has. Otherwise it is practically a customary engine, one of our engines, the basic engine is still there. The mounting surfaces are different, I want to emphasize that, the mounting surfaces are different.

358 As to other model numbers of engines Clinton Machine Company puts out, currently we start with a 100. VS. We have the 200 in the VS, and we have the 300. That is the obsolete engine. We have a 400 VS. Incidentally the 300 is made both horizontal and vertical. And then
359 we have — I would almost have to have a catalogue sheet to tell me, because we have 490-some odd parts in there that are a little different, for example, that I can't

Page of Transcript

memorize them all. I can go through—400 of the—I think it is 490, I am not sure about that. I would rather forget it. We have 700, and 800 and 900 and 1100, 1200, 1600 and 2500. Now, those are the engines that we are currently —.

• • •

363 Defendant's Exhibit 21 is the 700 block. You cannot determine from this whether it is VS or horizontal. It is a piece of cast iron cut from the side of one of our engines, the 700 Model and showing the crankshaft boss and the back or blind bosses of the mounting holes, and the camshaft boss and clearance around its surfaces. Also, the oil filler in the oil filler boss is shown. Exhibit 21 is a photograph of the section which is cut away from physical Exhibit D-9. I had those thumbscrews put in
364 afterwards. Defendant's Exhibit 22 is the mating part which was sawed from D-21. That is the remaining portion of the Defendant's Exhibit D-9. Exhibit D-23 is the carburetor side view of the engine in D-20, or the VS700. Defendant's Exhibit D-24 is a diecast aluminum bearing plate assembly with breaker points, cam, condenser coil, throttle mechanism, and governor mechanism mounted, and fits on our chain saw engine, our VS200 and VS400 engine. Defendant's Exhibit D-25 is a diecast end cover for the engine in Exhibit D-20, which is the same engine as in Exhibit D-23. Also it will go on the VS800 engine. It takes the place of the cast iron base, when the engine is used as a vertical shaft.
365 D-26 is a photograph of the inside of the coverplate D-25. D-27 is a view of the engine in D-20 on the opposite end or what we would call the rear of the engine.

• • •

Page of Transcript

371 This separable plate, which forms a part of Exhibit D-9, was sawed off for the purpose of this trial. I wouldn't use the engine in that form when I am normally using it. I probably would have difficulty. It just wouldn't work.

* * *

BERNARD J. CANTOR

Direct Examination

376 My name is Bernard J. Cantor, age 28, my residence is 24753 Rensselaer Boulevard, Oak Park, Michigan, and my occupation is a Patent Attorney. I have a degree of Mechanical Engineering — Bachelor of Mechanical Engineering in Cornell University 1949. Degree of Juris Doctor from the George Washington University, Washington, D.C. in 1952. I have had experience relative to patents and patent prosecution of applications. From 1949 til 1952 I was employed by the United States Patent Office as a Patent Examiner. Subsequent to that I was employed by the Kelsey-Hayes Wheel Company of Detroit, Michigan as Patent Counsel. And in March of 1953
377 I went into the private practice of Patent Law. I am now associated with the Patent Law Firm of Cullen & Cantor of Detroit.

* * *

385 I understand what is the claimed subject matter of Claim 5 of the Madle patent. In my opinion the preamble sets forth the environment for the description of the structure of the actual so-called inventive subject matter. The invention or the claimed subject matter would begin after the colon on line 55 with the words "fixed and movable breaker points accessibly mounted —" etc.

Page of Transcript

I heard the testimony of Mr. Kohls when he was talking about the Lechtenberg Patent '789. It is my opinion that there is a preamble in claim 1 of the Lechtenberg patent '789, and that the preamble starts with the first
386 word of the claim "A", and continues—"single cylinder internal combustion engine—" down to line 78, ending with "—by the fact that:". So the invention or claimed subject matter which constitutes the invention, in my opinion, is the subject matter following the colon.

* * *

395 On page 4 of the Defendant's Exhibit 28 I have prepared a chart which is headed as follows: Defendant's Chart Showing *That Defendant Uses a Cam and Cam Mounting* —. On page 4 on the right-hand side of the page I have a reproduction of Figure 7 and Figure 4 of the Madle Patent. That reproduction was made by taking an actual copy of the Patent and blowing those figures up to double size, and then pasting them on a sheet of paper and reproducing them photostatically. I will compare Figures 7 and 4 of Madle with the device I am holding in my hand, Plaintiff's Exhibit No. 21c. The Figure 7 of page 4 shows a gear 38. The device which I am holding in my hand also contains or comprises a gear. The gear of Exhibit 21c is apparently
396 made in one piece with a shaft which seems to be a camshaft. Now, Figure 7 illustrates an arcuate arm or what I have labelled a centrifugal weight which is colored green in the chart. The Exhibit in my hand, 21c, shows an arcuate arm or centrifugal weight, which is a crescent-shaped object pivotally connected to the cam, and restrained from movement by a spring. Incidentally there also is a spring 47 shown in Figure 7 on page 4. Exhibit 21c includes a collar which is re-

movable and which slides over and apparently fits upon one end of the camshaft, which is formed in one piece with a gear. The collar is circular in shape and simply slides over the end of the camshaft. It is carried by the camshaft and is not connected in any way to the gear. Now, referring to Figure 7 of page 4, colored lightly in red, is the back side of the cam of the Madle structure, Madle Patent drawings, which I have labelled as a cam located on the surface of the gear and on the opposite side of the gear from the weight. You will notice that is colored lightly in red. In Figure 4 the cam surface is colored in red also. Now, the cam 37 colored in red on page 4, is permanently and securely connected to the free end of the arcuate arm 45. So that any motion of the arcuate arm will also move the cam. And the cam
397 will move apparently the same number of degrees or approximately the same distance as the free end of the arcuate arm moves also. Now, referring to the structure in my hand, Exhibit 21c, the cam collar at one end is provided with what looks like a bump or projection, and this bump or projection fits within a depression or slot coming out of the free end of the arcuate weight. As the arcuate arm or weight swings outwardly because of the centrifugal force of the rotation of this gear, the cam will twist a certain number of degrees around the camshaft. Now, it can be seen here that the motion of a collar type cam is limited to just a few degrees, whereas the motion of the red-colored cam in Figure 7 and Figure 4 on page 4 of Exhibit 28, will swing quite a bit.

* * *

399 So that the weight is restrained in its motion. Now, the movement of the cam of Exhibit 21c, which is the structure I am holding in my hand, is caused by a torque

Page of Transcript

which is imparted to what we call the horn, Your Honor. And that torque is a force which is placed upon that horn by the weight. Now, in this structure in my hand, as the cam rotates and as the camshaft rotates, centrifugal force tends to throw the weight outward from the axis of rotation. In other words, putting my pencil through the center of this camshaft, the weight tends to fly away from my pencil. Now, the arcuate arm or weight is pivotally connected with the gear so that only the free end can fly away from my pencil. Now, the only element in the structure of Figure 21c which is responsive to centrifugal force or which in any way is operated by centrifugal force is the arcuate arm. That is the only object which is free to move by centrifugal force. The cam could not fly away from my pencil because it is solid on the shaft. If it would fly away from my pencil it
400 would burst into a million pieces and fly outwardly. So the cam is moved by a torque caused by the motion of the centrifugal weight. On the other hand referring back to Figure 7 and Figure 4 of page 8, the cam there is rigidly connected to the weight and for all practical purposes might just as well be considered as part of the weight. Now, that circular weight colored green responds to centrifugal force and the free end of that weight tends to swing away from the blue section of that drawing, the blue section is the part that corresponds with my blue pencil. And, therefore, that weight is responsive to centrifugal force, and since the cam surface of the cam itself is rigidly connected to this circular weight you might say that the part which is the weight and the cam together are responsive to centrifugal force. Examining Exhibit 21c, I don't see any cam surfaces on
401 the arcuate arm. I find no cam surface on the arcuate

arm or weight on Exhibit 21c, which I hold in my hand.

402 I do not find in Plaintiff's Exhibit 21c a structure corresponding to the phrase in Claim 5, "a member carried by said rotatable part for rotation therewith and for motion relative thereto in response to centrifugal force." As I said before, there is only one element in the device I am holding in my hand, Exhibit 21c, which is responsive to centrifugal force, and that is the arcuate arm. That arcuate arm does not carry -- Isn't that the word used in the claim? A Cam surface responsive thereto. There is no cam surface on said member, and by said member I mean the arcuate arm. Considering the Madle disclosure, it is my opinion that by that phrase and the following phrase, "and a cam surface on said member," as set out in Claim 5, the Madle Patent means the weight or arcuate arm, which is designated at 45 in Figure 7, and the attached cam surface and cam element 37. That is all that shows in the patent that corresponds to that phrase.

• • •

405 In my opinion, the mechanism of Madle, involving the cam follower and cam follower arm 35, the shaft 27, the contact bearing arm 28 and the contact 29, cannot be substituted with the structure shown in Exhibit 21d. I might add to my answer, amplify it by saying there is a different operation in these two devices of 21d and Figure 4 of the Madle Patent. As I mentioned in describing the device, Exhibit 21d, we had a push rod connected to the follower. Now, that push rod abuts against a rocker. It is not connected with the rocker in any way, just pushes up against the bottom of the rocker, and apparently can be removed by just pulling on it. While in the Madle device the same elements are physi-

cally connected together, and physically moved together, because they are connected together. He has a shaft 27, which oscillates, and the oscillation of that shaft is due to the movements of the follower and the follower arm 35 as it strikes or is struck by the cam surface. The oscillation of the shaft 27 causes motion of the movable breaker arm 28, which is identical to the motion of the follower arm 35. And I think that is pretty obvious, because all three parts are connected together. In 21d there is no such type of motion. There is no oscillation.

406 This is simply a plunger which goes up and down in response to rises and falls on a cam and in going up and down presses up against a rocker, which rocker carries at its opposite end the breaker point.

• • •

409 The reason why if you have a sleeve or a collar on a rotating shaft it can't respond to centrifugal force goes back to where we were before. As I said, a centrifugal force is a force which is radial from the axis of rotation. If we have a rotating shaft which carries a collar, that collar is affected by centrifugal force to the extent that if it were made out of something like putty or clay, or something easily broken, it would fly apart and spread out in all different directions.

• • •

411 I wonder if I could direct the Court's attention to page 12 of Exhibit 28 in my book, and that is where I have prepared a diagram of the Phelon Patent in order to more easily give my opinion. The Phelon Patent is concerned with a means of advancing and retarding the the spark of an internal combustion engine. Now, Phelon

412 accomplishes his object of advancing and retarding the spark by fitting a collar or cam which is shown in red

on Figure 4, page 12. It is shown in red in Figure 4, Figure 2 and Figure 3, around a shaft which is shown in blue. Now, the cam, which is designated as numeral 24, is loosely fitted upon the shaft 25, and has a bump or flat portion which I think can be seen in Figure 2 and Figure 4, against which a breaker assembly is operated. Now, the breaker assembly consists of, if I have these numerals correct, a rocker beam 22, which is fitted upon a securing member 23, and which at its left side in the drawings carries a breaker point 20, which makes a breaking contact with a fixed breaker point 19. Now, the right side in the drawings of the beam 22 has a portion extending upwardly in the direction of the cam, and the cam is shown in red. Now, I have in Figure 4 shown a lead line and marked it FOLLOWER, which is the element I mentioned before, which contacts the cam and which causes the rockable beam to rock. Now, as the shaft 25 rotates the follower rides along the surface of the tubular cam, which is the same type cam, I might add, as seen here in Plaintiff's Exhibit 21c. Of course, the follower contacts the cam and gives the beam a rising
413 and depressing operation, in this case a flat portion, and the breaker points open. The problem Phelon was concerned with was in advancing and retarding the opening and closing of these breaker points. And he accomplished this by means of a circular weight which is shown in green in Figure 1 and in Figure 3. Those are the drawings on the right-side of page 12. You will notice that the weight is pivoted to a large circular element which in this case is a flywheel of the internal combustion engine. This flywheel rotates with the shaft 25. Now, the rotation of the flywheel and the shaft causes the weight which I mention as shown in green

Page of Transcript

to swing out into its dotted position shown in Figure 1. And as the weight swings out in response to centrifugal force the movement of the weight is translated to the cam; . d the means for effecting the movement of the cam consists of an arm which I show in yellow in all of the drawings and particularly in Figure 3 — that is the drawing on the lower right-hand side of page 12. This arm is connected at the fitted opening to — that is, numeral 2, to the centrifugal weight and goes through the flywheel 10 and has an upper end 8 which fits into a slot weight in the tubular cam 24. Therefore, it can be seen that movement of the green — I will refer to the
414 colors in accordance with my diagram — centrifugal weight twists the yellow arm, which in turn causes the round portion at the top of the yellow arm and causes the red cam to rotate a certain number of degrees relative to the blue shaft. Now, as it happens this blue shaft is the engine crankshaft. As it also happens the flywheel is a part of the magneto structure of an engine. But I think this Patent brings out *very, very* clearly a timing mechanism which in my opinion is substantially identical to the timing mechanism which I see in Plaintiff's Exhibit 21c. Now, the difference between the timing mechanism in 21c and in Phelon is that in 21c the weight and the cam are both on the same part of what I will call now a rotating part, which is the gear. I will just call it a part. They are both on the same side of a weight part. Whereas in Phelon they are on opposite sides of a part. In other words, the green weight is on the lower side of the flywheel and the red cam is mounted on the camshaft, or in this case the crankshaft, on the opposite side of the flywheel.

* * *

420 Referring to page 12 of my chart, Defendant's Exhibit 28, referring to Figure 4 which is the figure on the lower left-hand side of that page, I think it is apparent that the member which I have labelled as follower, with a lead line connected to the member, and to the word *Follower*, abuts up and rides along the surface of the cam which I have shown in red. I think it is clear from this drawing to which Figure 2 directly refers, there is no physical connection between the follower and the cam, but the follower simply rides along the surface of the cam.

As to whether in the Madle Patent the cam follower, the cam arm, the shaft 27, and the movable contact 29, and the contact carrying arm 28, constitute a unitary structure or a plurality of separate parts, that is a hard one to directly answer. They are apparently separate parts, but they are all fastened together rigidly, so they could all be considered as one element. I would say
421 they constitute a unitary structure. In Exhibit 21d the cam follower, the plunger, the rockable beam, and the movable contact, do not constitute a unitary structure. The plunger in Plaintiff's Exhibit 21d abuts up against the surface of the rocker, and there is no actual connection between the two. By two, I mean the rocker and the plunger. Examining Exhibit 21d, I would say that the cam follower is not connected with the movable breaker point or contact. By connected, the word connected to me means a physical fastening or a physical interlock of two parts. In this case I find no physical connection between those two parts.

* * *

424 Now, in my opinion the problem that Madle was concerned with could really be broken down into two

Page of Transcript

parts. The first part was that he wanted to get his breaker assembly — by breaker assembly I am particularly interested in the movable and the non-movable breaker points — into such a position on the engine where he could get to them in order to repair or replace them or in any wise adjust them. So that the first concept which I feel Madle was concerned with, was the concept I
425 have listed as No. 1 on page 1 of the chart Defendant's Exhibit D-28 that I have referred to. "To remove" — I am reading: "breaker assembly and advancing means from inside flywheel and to place them in an accessible place." The reason I say from inside flywheel was that in the Madle specification the specification talks about breaker points being inaccessibly mounted inside of the flywheel or the flywheel magneto, and that one of the objects of Madle's invention was to take these breaker points and put them somewhere else other than inside the flywheel where they would not be too accessible.

Now, the second concept or problem that Madle was concerned with was that of advancing and retarding the spark, and I have that listed as Number 4 on my list of concepts. Incidentally, I also have a Number 5 which follows Number 4 and really is part of Number 4, wherein I have written it: "To advance and retard spark by means of a centrifugal means." And beneath that I have: "(a) a cam operated by a weight, and (b) a follower operated by a cam to operate breaker points." Now, I think the two concepts or problems I have just mentioned can be clearly broken in half and be treated separately. The first concept is that of getting the breaker points into an accessible location on the engine. And for all practical purposes it has very little, and in
426 my opinion nothing, to do with the actual timing or

advancing or retarding of the spark. Now, the second problem is that of advancing and retarding the spark. And I think the spark advancing and retarding has nothing whatsoever to do with the location of the breaker points. Now, to diverge for a second I think Mr. Harkness said the other day, when I was listening, that the advancement and retarding of sparks was known in the distributor art in the automobile industry. Now, what I am attempting to do here is to show and to agree with Mr. Harkness, that the advancing and retarding of a spark by what I call a cam operated by a weight and a follower operated by a cam to operate breaker points, was very well known in the art, and it was known a long time before I was born. I think the second problem, or actually the first problem I mentioned before, that of accessibly mounting the breaker points, was also very well known in the engine art. And the combination of both concepts was well known in the engine art.

Now, leaving page 1 for a moment, I would like to show if I can a brief description or a brief resume of the various prior art patents that were relied upon by the patent examiner in the patent office when he examined this application, and when he allowed the Claim 5 and
427 the other claims in the Madle Patent. The reason I have reviewed these patents is that I want to show just what novelty Madle had there, what the examiner had on his desk by way of prior art patent copies. Now, referring to page 2 of my chart, Plaintiff's Exhibit 28, I show on the left-side of the chart a reproduction of figures 1, 2 and 5 of the patent to Kettering No. 1,463,958. Now, this was one of the patents which was cited by the patent examiner during the prosecution of the Madle application. Incidentally, I have only showed the first sheet of

Page of Transcript

the two sheets of drawing and part of the sheets—and not the drawings of the remainder of the patent because I don't think they are particularly pertinent here. I would like to point out that Kettering discloses—and this is listed below the Kettering Patent—: a single cylinder, four-cycle engine having a crankshaft driven magneto and a timer shaft operated at one-half crankshaft speed. He also showed normally closed breaker points, which caused a spark when opened, and which are accessibly mounted on the outside of the engine. Now, Kettering's timing cam was not adjustable, it was a fixed
428 type cam. Referring to page 10 of Defendant's Exhibit 28, I have set out in a little more detail just what it is that Kettering Patent 1,463,958 does. I made a separate chart on Kettering. Now, as I said, Kettering does not adjust or advance and retard his spark by means of an adjustable time cam, but I think if you will look on Figure 1 of the Kettering drawings it can be seen about the center of Figure 1 the word "Timer" appears. I didn't put that in, that happened to be on the Patent there itself. Now, that is the timer mechanism. And referring to the Kettering Patent itself I would like to read one of the objects of Kettering that refers to the timer mechanism. This object appears directly beneath the reproduced drawing of the Kettering Patent on page 10 that I have been referring to. Now, you will notice I have a list noted as Kettering's objects, as set forth on page 1 of the specification. What I did was, I actually cut up a patent and cut out these words from the specification and have them reproduced. Now, in lines 32 to 35 one of
429 the objects is cited as follows: "A further object is to provide a separate location for the magneto timer which shall be accessible without requiring the removal of the flywheel." That was one of Kettering's objects. And he

accomplished that object by locating that device, which is noted as a timer in Figure 1, on the outside of his engine casing. Now, as a quick explanation of how Kettering operates, I might say that Kettering has a crankshaft which is connected to the piston and which rotates in accordance with the operation of the engine. Now, the crankshaft is shown in Figure 2 of the Kettering drawing as Number 36. And there is a gear 42 on that crankshaft which meshes with a gear on a timer shaft 44, which I have colored in blue and which causes that timer shaft to rotate. Now, I think you will notice in that Figure 2 that I have a red line near the lower left side of the blue-colored shaft 44. That red line represents a flat portion which is the actual cam portion and which is formed directly on the timing shaft. Now, a follower, I think the number is 57. You may see there is a follower there which appears as a black dot near the red line I have drawn on Figure 2 and which rubs up and around shaft 44 and moves against the flat portion which I have just mentioned and which I have
430 designated in red. That movement of the rubbing block or follower operates a follower arm which causes the breaker points 51 and 52 to open and close. Now, I think it is pretty clear that the patent examiner at the time that he allowed the Madle Patent, and at the time he reviewed the Madle application knew that locating breaker points at an accessible position on the engine was certainly old. I might add th as a customary procedure that probably wouldn't hav een the point of novelty which caused the examiner to allow the Madle claims. If that was a point of novelty then obviously he would not have allowed those claims.

Going on to the next patent, which is on page 2 (of Exhibit D-28), which is a Patent to Smith, 1,291,216,

and a picture of which appears in the center of page 2 labelled Figure 1. The patent to Smith discloses a single cylinder engine having a crankshaft-driven magneto, and a camshaft driven at one-half crankshaft speed. The actual speed of the crankshaft is no longer in this suit, if I am correct. But as it happens the camshaft in this case is driven at one-half engine speed. There is a cam 5 located on the camshaft, and I have shown that in red. Now, that cam 5 functions to operate a follower which
431 is designated as 47 and the follower is connected to a follower arm 45, which extends directly to the left of the cam which is colored in red. Now, extending vertically to that follower arm is a shaft or plunger 50 which abuts up against an arm 56, to which the movable breaker point 57 is connected, the fixed breaker point being connected to some sort of plate which is fastened on the outside of the engine casing. Now, reviewing this patent the significant features I find here are that first of all the breaker points are accessibly mounted on the outside of the engine casing. And to repair or replace these points, access can be very easily had by simply lifting the cover which is shown as a dark line lying over the breaker assembly. Now, the second significant feature of this patent to me is that the cam 5 is located inside of the engine crankcase and the follower is also inside of the engine crankcase. Now, as I recall from listening to the testimony of yesterday and the day before, it seems to me that mention had been made that one of the advantages of Madle's device—and I couldn't find this advantage in the Madle Patent, but I suppose the structure itself might lend itself to such an advantage—is that the follower was located with the cam in an oily
432 zone inside the engine and that the breakers were located in a non-oil zone, which tends to prevent deteriora-

tion to the breaker points. I think Smith clearly demonstrates that feature was certainly well known at least back as far as the filing date of September 2, 1916. Now, as it happens the Smith Patent, like Kettering, does not adjustably mount cam 5, and does not provide for any means for advancing and retarding the spark by means of rotating his cam 5. And I think, as an aside, to diverge it should be understood that the advancement and retarding of sparks is normally seen on relatively higher horsepower engines. And that on a low horsepower engine, such as a one horsepower engine, normally the manufacturers do not advance and retard sparks. There are engines where they are advanced and retarded, but the big problem of advancing and retarding on a low horsepower engine is that of the cost of an advancing and retarding mechanism. And on a small cheap engine which has little horsepower the manufacturer normally don't bother with such advancing mechanism. And it seems to me that this would appear to be borne out in the Kettering Patent and in the Smith Patent, which I would assume is a low horsepower engine.

433 Now, going one step farther to the Smith Patent No. 1,636,017, which is on the right side of the page two of the charts of Defendant's Exhibit 28, without going into too much detail since it is a rather difficult drawing to read, I will say that Smith shows an advancing and retarding mechanism for the purpose of advancing and retarding his spark, and that this mechanism consists of circular weights which are designated as 76 on Figure 4, which rotate pinions 68, which is a small gear in this case, and that the pinion 68 rotates a larger gear 71 to which cam 77 is connected. Here the cam 77, which is almost impossible to see in these drawings here—there is another

Page of Transcript

figure in the Smith Patent which I do not have on my chart which shows that the cam 77 abuts up against a spring type of mechanism for holding the movable breaker contact and that by striking that spark timing mechanism sooner or later with the cam 77 the spark will be advanced or retarded. Now, this disclosure of Smith is a rather complicated way of advancing and retarding sparks and the cost of all the gears involved I imagine is quite expensive. Whether it is a practical device is something I couldn't answer, but at least to my mind it does not look like a normal way of handling this type of situation, and at the time the examiner felt the same way.

434 Now, referring to page 3, I will refer first to the Patent to Lefebvre. That is page 3 of Exhibit D-28. That is the Lefebvre Patent No. 2,215,106, which appears to the left center of page 3. Now, this disclosure of Lefebvre relates to a multi-cylinder engine, and relates to a timing mechanism which causes the spark plug in each one of the cylinders to spark at the correct time. In my study of the Lefebvre Patent I did not find any means for advancing or retarding the spark, but instead I directed my study to several features that I thought very significant here. One of the significant features which I find was that the cam which is designated as 17 in Figure 1 of the Lefebvre Patent—that is, the lowest part of Figure 1, is located within an oil zone inside of the engine casing, and that the follower which has a roller bearing on the end of a push rod 20 is also located inside of this oil zone. Now, I call The Court's attention to the fact the push rod 20 is the same type of rod that is used in that Exhibit 21d. That is, the rod has a follower which rides along the surface of the cam 17, and the push rod

goes to the left or to the right in response to the motion of the cam 17. The end of the push rod abuts up against
435 a rocker beam 22, which beam is fitted to a pivoting device on rod 23, and the rockable beam 22 carries the movable contact 26, the fixed contact 27 apparently being fixed in some sort of close relationship with the movable contact. I think I can compare the Lefebvre structure with the Exhibit 21d and show that the push rod 20 with a follower at its left end is the equivalent, in fact they are the same push rod or plunger which we were talking about before in 21d, that the push rod 20 abu up against a rockable or rocker, I guess is the best way of describing it, in 22 in the same way that the plunger in Exhibit 21d abuts up against a rocker, and that in the case of Lefebvre as in the case of 21d, the movable contact is carried by the rocker.

Now, I think we can leave that Patent for a moment and refer to one of the other patents which the examiner cited as prior art in the Patent Office. And that Patent is the Patent to Littlefield, 2,013,541, which is the picture appearing on the extreme right side of page 3 of Defendant's Exhibit 28. The Littlefield device has a timing mechanism which in this case is used for a multi-cylinder engine. The significant features which I felt were of interest was that first of all the cam or cam beams, which
436 I have shown as red spots in Figure 1 of the Littlefield drawing on page 3, are fixed to the surface of a gear 10, and that this gear 10 is used to drive the engine camshaft 11. In fact the camshaft 11 and the gear 10 are connected together. Now, further in Figure 1 at the center of the figure there is a rocker which I think is designated as 24. The numbers are hard to read on this particular diagram. This rocker, or follower, which I will call 24

Page of Transcript

for my own convenience abuts up and is struck by the cam beams which I have shown in red. And the opposite end of the rocker carries the breaker points 29 and 30, and causes these breaker points to open and close in response to movement of the follower rocker which I am calling 24 in this case. Once again I would like to bring out the thought that the follower end of the rocker abuts up against a surface type of cam which is fixed to the gear 10; that this follower is located inside of the engine casing adjacent to the gear, and that in this type of engine there is an oil atmosphere, that this oil atmosphere would also surround the cam and the cam follower. And I also know that the breaker contacts which can be seen quite clearly in Figure 3 of the drawings on page 3, is located to the left of a plate 34, or in other words are located in a dry atmosphere where I would assume the oil would not penetrate to any large
437 extent. Now, in this Littlefield Patent the interesting thing about it is that Littlefield was interested in advancing and retarding his spark but that rather than advancing and retarding his spark by means of an adjusting timing cam he took the back door approach and adjusted his follower position. Now, the follower happens to be mounted on a plate which I mentioned before as being plate 24, and there is a manual rod which appears on the left side of figure 2, which is connected to the plate 34. Now, if Littlefield wants to advance or retard his spark by in some way or another pulling or causing a thrust on the rod 61 he is able to adjust plate 34, which likewise causes the follower mechanism to be adjusted relative to the fixed cam points which I have shown in red.

• • •

Page of Transcript

439 I think the Court will notice that the Plate 34 is a circular type plate and that this plate is fitted within castings shown as annular ring in Figure 2 in 42, and in Figure 3, and there is some sort of flange — I don't see any number on that flange — on the right side of plate 34 in Figure 3. Plate 34 rides in a circular track so that the plate can be twisted within the track in any position. It is the same idea I suppose of taking a milk bottle cap and twisting the cap within the bottle in different positions.

Now, in reviewing these patents which I have just discussed it seems clear to me — I am referring back to the concepts which I listed on page 1 — that at least the first concept, which is to remove the breaker assembly from inside the flywheel and to place them in an accessible place, was well known and was shown by the prior art patents which were made of record by the
440 patent examiner in the prosecution of the Madle application. The patents that show that first concept are the patents to Kettering, the patent to Smith 1,291,216 and the patent to Lefebvre, and the patent to Littlefield.

Now, what we have left is concept 4, that is number 4, which I have given the name "to advance and retard the spark." Now apparently the examiner knew that was also old because the Smith Patent No. 1,636,017, showed advancing a spark and retarding a spark.

Now, from reviewing all of this material my conclusion is that what was new in Madle, which was not shown in the prior art patents, was the specific construction of the timing mechanism itself. That is, none of the references show a timing mechanism which in any way looks like the breaker of Figure 7 for example which

Page of Transcript

appears on page 1 of the Defendant's Exhibit 28. I am referring only to those prior art patents and references appearing in the file wrapper.

• • •

442 Now, referring back for a moment this is on Chart 11, page 11 to the patent to Charles F. Kettering 1,463,958. As I said before, this patent was one of the file wrapper patents which was made of record by the patent examiner in the prosecution of the Madle applications. Now, as I said before, that patent showed a single
443 cylinder four-cycle internal combustion engine. There also happened to have been a magneto connected with the crankshaft. A timer shaft 44 is geared to the crankshaft 36 and operated at one-half crankshaft speed. Now, a timing cam 57, which is a flat portion on the timing shaft, is provided. I don't have that colored on page 11, but I think if we refer back to page 10 a moment we can see the red line which signifies the cam portion on Figure 2 of Kettering. Incidentally, the drawing of Kettering 1,463,958, on page 11 is the same as the drawing on page 10. Page 10, in addition to that drawing, also shows a wiring diagram of Kettering's breaker points, and that of his magneto, which was made to explain the magneto and breaker point operation, which is no longer involved in this case, therefore, I will not refer to that figure further. Kettering shows breaker contacts 51 and 52, and he shows these breaker contacts on the outside of the engine crankcase for accessibility. As I mentioned before, Kettering does not show advancing and retarding of his spark by any automatic means.

This second patent to Kettering which appears to the middle left on page 11, is 1,430,524. Now, this patent discloses substantially the same subject matter disclosed

Page of Transcript

443 in the first Kettering Patent, that is, so far as the subject matter is relevant to the claim now in suit in the Madle Patent. The reason I put in this patent was that as I show in blue in Figure 3 Kettering's timing shaft serves two functions. First, the time shaft timing of the breaker mechanism for the sparking of the engine and, secondly, it also is a timing shaft for the valves of the engine, to time the valves. Therefore, I wanted to make it clear that a timing shaft is a timing shaft and may be used either solely for the purpose of operating a breaker mechanism or alternatively to operate a breaker mechanism and the engine valves, and I think that blue-colored area of Figure 3 discloses that feature quite well.

Now, stepping over one figure to the right, I am now going to discuss the patent to Kettering 1,465,644. Now, this patent to Kettering, which was filed as an application on October 4, 1915, which was issued in August of 1923, shows that Kettering was concerned with the problem of advancing and retarding his spark in an engine, and was specifically concerned with the problem of automatically advancing and retarding the spark. Now, I have colored the various elements in this figure in order to illustrate the various elements which I think are comparable to those elements in the Madle Patent,
445 and incidentally also to Plaintiff's Exhibit 21c. Now, you will notice that in Figure 2, which is the Figure on the upper-left side of that drawing, shown in green are its arcuate arms 262, which are fixedly connected to a part or disc which is shown in yellow in the Figure 1, directly beneath Figure 2, and labelled 261. Now, the yellow portion 261 is fixed on the timing shaft 257, which is shown in blue in Figure 1, so that the rotation of the timing shaft rotates the yellow portion 261, and also,

Page of Transcript

of course, the weights 262, which are shown in green. As the speed picks up these weights, which are a centrifugal type of weights, pivot at their free end outwardly from the axis of the shaft 257. Now, I think by referring to Figure 2 for a moment, it can be seen that there are openings or depressions 267 in the weights, and that these openings or depressions engage horns which are labelled 270 in Figure 4, and are shown in orange in Figure 4 of the Kettering drawings. Now, these horns
446 are fastened to a shaft, and on top of portion 271 of the shaft a cam 268 is mounted. Now, I think it should be specifically noted that the cam 268 is a tubular-type cam. In other words, it is like the cam which is shown in Plaintiff's Exhibit 21c. And as cam 268 is mounted upon the shaft 271 it becomes part of the structure shown in Figure 4, and the horns 270 shown in orange are directly related with the cam so that the movement of the horns will cause movement of the cam itself. And I think that corresponds to what we called a horn yesterday on the cam of Exhibit 21c which is engaged in a depression in an arcuate arm or weight in the same way that Kettering operates his timing mechanism. I might add, the Kettering application so far as I can make out seems to be concerned with certain novelties concerning the weight itself, to eliminate the weight, but it is not pertinent here and I won't refer to it any further, I will restrict myself to the colored elements which I mentioned before.

447 Now, I will turn to page 13 of Defendant's Exhibit 28. On this page there is shown Figure 1 and Figure 5 of the patent to Sturtevant, Patent No. 740,781. This chart was made by taking a double-sized exposure of Figure 1 and reproducing it on this page. Figure 5 is a single-size exposure, wasn't blown up, it is actual size from the

patent. Now, Sturtevant discloses an ignition timing mechanism which includes a cam shaft gear fixed on the camshaft. And this gear is designated by the numeral 25
448 in Figure 1. The camshaft gear meshes with a gear that is on the engine crankshaft, and that is not seen in Figure 1, but I believe an examination of the other figures of the patent which are not shown in this chart, will show that to be true. For example, in two of the drawings not shown on this chart, the cam gear is shown as being twice the size of the camshaft gear, and therefore in my opinion must drive the camshaft 26 — which is shown in blue on the chart, Your Honor — at one-half crankshaft speed. Now, I will repeat, the camshaft is shown in blue on Figure 1 and also in blue on Figure 5. And the gear is mounted on this camshaft. Now, a cam plate 39 — that is shown in green, Your Honor, in Figure 1 — is rotatably carried on the camshaft 26 shown in blue, and upon this cam plate there is fixed a cam portion or cam bump 38 shown in red. I think it can be shown that the red cam bump is fixed to the green cam plate, and together they rotate or can be rotated on the camshaft 26 shown in blue. Now, there are centrifugal weights 42. Those are the elements which I colored yel-
449 low on Figure 1. In this case it is interesting to note that Sturtevant uses two weights, one opposite the other. They are fixedly connected to the cam gear 25 at pivots 41. These weights swing outward under centrifugal force due to rotation of the camshaft gear 25, and its swinging is resisted by the springs 45. Those are those vertical zig zag lines which appear on opposite sides of the green cam plate. The weights are connected to the cam plate 39 by means of links 46, and I also show those links in yellow to each side of cam 38. Now, as the weights swing

Page of Transcript

outwardly around their pivots 41 due to centrifugal force, links 46 which are connected to both the weights and the cam plate 39, causes the cam plate to rotate relative to the blue shaft 26, and that this rotation of the cam plate relative to the blue shaft moves the cam bump 38 to either advance or retard the spark.

Now, what I would call attention to is the timing mechanism, the mechanism to move the cam. Now, referring to Figure 5 for a moment, which is the figure appearing on the lower left side of page 13. In this figure the breaker mechanism is shown, and the breaker mechanism consists of a follower 37, which is located adjacent to that vertical red line on Figure 5. The follower
450 37 contacts cam bump 38 once every revolution of the camshaft 26. Now, each time that follower contacts the cam bump, the plunger 36 moves to the left. And the plunger 36 at its extreme left end carries a breaker point, and going farther there is a contact which is called an anvil, in the point 35, a fixed breaker contact. Now, the structure shown in Figure 5 is actually designed so that the plunger not only reciprocates back and forth towards and away from the cam plate, but also turns slightly in order to assure there is a clean contact at all times between the breaker points. Now, I don't think that feature is significant to bring out the fact that this plunger and this follower carries a movable breaker contact, that this movable breaker contact engages a fixed breaker contact. I also want to bring out that the follower 37 is shown to the right of the cutaway part of the engine 33 in Figure 5 — that cutaway portion is the cover which fits over the gear and tir ng mechanism area — and that the cover 33 may be removed and that such removal will take the mechanism along with it. So that

Page of Transcript

it is apparent that the follower is inside of the engine wall where it is susceptible to being lubricated, and that the breaker mechanism is outside and accessible,
451 as shown in Figure 5.

Now, in my mind, while I had a great deal of difficulty yesterday in attempting to read Claim 5 of the Madle Patent on the device 21c which I now hold in my hand, I think I can say categorically that if Claim 5 could be read upon this device 21c, in my mind then Claim 5 must also be read upon the device shown in the Sturtevant Patent. Because the device 21c in my hand includes a movable breaker arm and a movable cam, which cam is carried and rotates upon the cam shaft and not by the cam gear. The purpose of my showing the drawing of the patent to Sturtevant was to show that at least as far back as October 6, 1903, which is the issuing date of the patent to Sturtevant, that it was well-known in the engine art to take the camshaft gear and to pivotally mount upon the camshaft gear centrifugal-type weights which are restrained by springs. That it is also old to mount an adjustable timing cam on the camshaft and to cause the adjustable timing cam to rotate relative to the cam shaft by means of some sort
452 of engagement or connection with the centrifugal-type weights. That it is also old to accessibly mount breaker contacts on the outside of the engine casing, as shown in Figure 5, and to have the follower of the breaker mechanism inside of the engine casing and in engagement with the adjustable cam.

Now, I would like to refer to the next page, page 14. Page 14 is a double-sized reproduction of the drawing of the British Patent to Pullin, No. 310,082, which application was sealed April 22, 1929. Now, this patent to Pullin — this British Patent, part of which I have

Page of Transcript

colored, discloses a timing mechanism. This is a timing mechanism, and Pullin feels it may be used in any number of places. He does not show any breaker contacts that are movable, or any other object which is movable other than a plunger, which is colored light yellow, and to which plunger he can connect whatever he wants to move. So this shows a timing mechanism per se. Now, Pullin discloses a crankshaft 8, which is the top shaft in Figure 1, which is geared to a camshaft 12 by means of two interconnecting gears 10 on the crankshaft and 13 on the camshaft. Now, you will notice that I show the
453 camshaft colored blue. You will also notice in Figure 2, which is a cross-sectional view of a part of a camshaft, and the gear 13, that apparently the gear and the camshaft are formed in one piece. I don't know why he made it in one piece, but it is apparent at least from the drawings that the camshaft and the gear are one piece. And I show only the camshaft in blue. Now, slipped over that camshaft is a cam 11, shown in red. This cam 11 is a collar and slips over the camshaft in the same way that this collar cam on Plaintiff's Exhibit 21c slips over the end of the camshaft. Abutted against the red cam is the follower 29, which is shown in yellow. And a plunger rod 28 extends upwardly in Figure 2 from the follower 29 for plunger movement towards and away from the axis of the camshaft. Now, I think that so far as I have gone and by reference to 21c we can say that we have in 21c a camshaft, a cam gear, a cam which is solidly and rotatably mounted upon the cam shaft, and which is adapted to have a plunger-type follower abutting against the cam surface of the tubular cam. Now, what is missing in the Pullin Patent is that the cam 11, which is shown in red, is not automatically adjustable. The cam

Page of Transcript

is adjustable but only by manual means. In order to adjust this cam, the cam itself is provided with openings
454 25, which is shown in Figure 2 and into which a pin 16 slides. Now, the pin slides through an opening in the gear 13 and maintains the cam 11 in a fixed position relative to the gear 13 and relative to the camshaft 12. If it is desired to adjust the cam or to retime the device, then that must be done by removing the pin 16 manually and rotating the cam until the next hole is lined up with the pin 16 and then shove the pin back into the hole. The reason I illustrated the drawing of the patent to Pullin was that I wanted to make it clear that the art, as far back as April 21, 1929, the sealing date of the patent to Pullin, knew enough to slip a tubular-type cam on a camshaft next to a camshaft gear and to use a plunger-type follower and follower arm abutted up against the cam surface of the cam. And I think this drawing clearly brings that out.

Now, referring to page 15 of Defendant's Exhibit 28, in a chart shown there, which is labelled "Defendant's Chart Showing *That it is Old to Pivotally Mount a Centrifugal Weight on a Camshaft Gear, and to Use the Weight to Adjust an Ignition Timing Cam Carried by the Gear*". Now, you will notice that Figure 1 of Erickson, which is the patent shown on this page 15, Erickson No. 1,401,058, shows a camshaft gear 1—this is Figure
455 1 I am referring to—which carries the centrifugal weight 16, which I show in green. Incidentally, that centrifugal weight is broken into several parts, and I generally call the weight 16 and color it green in order to simplify my description of this patent. Now, the cam gear 1 is mounted on a shaft shown in blue on Figure 1. Pivotally mounted on the cam gear 1 is a cam shown in red, and this red

Page of Transcript

cam is pivoted at 13 to the gear 1. Now, it can be seen that as gear 1 rotates, the weight 22 on the end of the centrifugal weight show in green will swing out into a dotted position shown in Figure 1, and that this movement will cause the opposite end of the weighted arm, that is, the end 18, to move the cam 12 shown in red to its dotted position, also shown in Figure 1. The cam movement is limited by means of stop pins 14 and 15, something equivalent to that in Claim 5 to my recollection. But as I remember there were stop bars involved in this suit and there were stop bars described previously by whoever it was described Plaintiff's Exhibit 20c, to show that the cam is limited in its movement by means of a pin and stop bars formed on the cam surface of Plaintiff's Exhibit 20c. And I think it is apparent that the use of stop bars to limit the motion of a
456 cam was not new and was very beautifully illustrated by whoever drew the original patent drawings to Erickson, which patent issued in December, 1921. Now, this timing mechanism of Erickson, that is, the cam and the weight which moves the cam and the gear is used to move a follower arm 8, which is shown in yellow. The follower arm 8 is connected as part of the magneto mechanism, and because the magneto mechanism is of no importance in this case I will simply say that 8 is a follower arm, period, and that you may connect in my opinion whatever you may want to connect on the opposite end, that is, the end opposite to the end which indicates the red arm. Thus I will limit my discussion concerning the remaining construction of Erickson.

Now, turning to page 16 of Defendant's Exhibit 28, I have illustrated here the drawing of the patent of Cochran, and I labelled this chart "Defendant's Chart Showing *That it is Old to Adjust an Ignition Timing*

Page of Transcript

Cam by Means of Centrifugal Weights Pivoted Upon a Part Fixed to and Rotated with a Timer Shaft", as disclosed by Cochran's Patent 798,992, September 5, 1905. Now, the patent to Cochran discloses a part 10 which is shown in Figure 1 of the Cochran Patent as a circle affixed to and rotated with a shaft 9, which is colored blue in Figure 1. The patent also discloses a circular
457 weight 18 which I have shown in green. Now, in the patent the various parts of this circular weight are given different numbers. However, I will refer to this entire weight as the green weight, or weight 18 and eliminate all extraneous numbers. The circular weight shown in green is pivotally mounted on the face of part 10 and the end of the weighted member, and engages cam 11, which is shown in red, and I think it is apparent that the rotation of the part 10, and, of course, the shaft to which the part is connected, will cause the lower right side of the green weight to swing away from the blue shaft and cause the upper left tongue portion to push the red cam 12 downward in the slots 13 and 14 into the direction of the yellow-colored follower 3 in this particular drawing. It is to be noted that the cam 12 is carried by the fixed part and is carried by means of pins 12, which extend through the slots 13 and 14 in the fixed part, in order to prevent the cam 12 from becoming loose from the fixed part. Now, I observe in reading this patent that the cam 12 was not physically connected to the weight number 18 shown in green, but that it is pushed by the end of the weighted member in one direction, and it is returned from that direction by means of the spring 19, which is a leaf-type spring having one
458 end 22 connected to the red cam and a portion extending between studs or buttons 23 on the green weight and connecting it with a pin 21 on the fixed part and another

Page of Transcript

stop of some sort 22 prime. So that it can be seen that this spring 19 restricts the motion of both the green weight and of the red cam. And that the cam and the weight will move together at all times despite the fact they are not physically and integrally connected. Now, you will notice that I have colored in red a Follower 3, and that this Follower 3 is the equivalent of a plunger, because it is pushed towards and away from the axis of the camshaft, and that this plunger or follower 3 causes a rockable arm 2 to rock and thereby open and shut the movable contact breaker point 4 and the fixed contact breaker point 5. I bring this patent in for the purposes of showing that at least as far back as September 5, 1905, it was well known to adjust a cam mounted on a fixed part by means of a centrifugal weight also mounted on the fixed part, that at least as far back as 1905 it was well known to use a follower which strikes the cam once each revolution of the fixed part on its camshaft in order to open and close ignition breaker points.

Now, proceeding farther to page 17. Page 17 refers to the patent to Heaslet, No. 1,239,689. On this page 17
459 of Defendant's Exhibit 28, I have placed a title which reads as follows: "Defendant's Chart Showing *That it is Old to Adjust a Timer Cam Carried by a Timer Shaft by Means of Centrifugal Weights Pivotally Carried on a Part Fixed to the Timer Shaft* as disclosed by *Heaslet* No. 1,239,689, Sept. 11, 1917." Now, the patent to Heaslet is important because it shows a mechanism for adjusting a cam which is quite similar to the mechanism broadly disclosed in relation to the Madle device and specifically mentioned in relationship with Plaintiff's Exhibit 21c. Now, you will note that I use a color scheme—I put these colors in myself with colored pencil—in

which I show the engine driven timing shaft 22 colored blue. And that blue shaft can be seen in Figure 7, Figure 8, Figure 3, and Figure 4, which are Figures actually cut out of the Heaslet Patent, and reproduced on this large sheet of paper. Now, there is a part 48 which I colored yellow, which is fixed to and actually shown as being integral with the timer shaft 22. That yellow part is a long narrow member and is colored yellow, and can be seen in Figures 8, 7, 3 and 4. Now, the fixed part which I will refer to as the yellow part has pivotally mounted on it a pair of weights or arcuate arms
460 which I colored green in the different views of the drawing. I think it is apparent that the rotation of the timer shaft 22, which is geared to the engine crankshaft in any suitable way, according to the patent, causes the fixed part—the yellow fixed part to rotate with the timer shaft, and as the speed increases causes the arcuate arms which are shown in green and which are circular weights to move or attempt to move away from the axis of rotation. Now, since the green weights are pivoted at one end to the yellow fixed part, only the free ends which are the ends to which springs 53 are connected with a small round button, as can be seen in Figure 4, move away from the axis of rotation. Now, these free ends of the circular weights are connected by means of links 60, to horns, which I colored orange and are shown in Figure 4, Figure 3 and in Figure 8. The horns are part of a tubular-type cam. The tubular type cam consists of a tubular member having a hole through the center, which hole permits the entry of a tip part 50 of the timer cam 22 as shown in Figure 8, and the actual cam bumps of the cam lobes are located, in Figure 8, that is, at the top of that member colored red. And I think if we refer to Figure 2 we can see the top view of the cam lobes, which

Page of Transcript

461 are shown in red. Now, the purpose of this timing mechanism and these circular weights that I have mentioned, is to cause the cam 54 colored in red to be adjusted relative to the timer shaft 22 in order to advance and retard the sparks of the engine. I might also mention that the particular problem which Heaslet was concerned with in his patent, along with this, was also that he wanted to adjust his casing, that is, the whole box that holds the timer mechanism, relative to the timing shaft in order to adjust the follower, which I will describe in a moment or so—so as to obtain two adjustments for advancing and retarding the spark. However, the adjustment of the box itself or container is not pertinent to this case, so I will restrict myself only to the one device which is shown; namely, the circular weights which are used to move horns which are connected to a tubular-type cam shown in red. Now, referring to Figure 2, which as I have mentioned before is a top view of the cam lobes and the cam 54, we can see that a follower 43 comes into contact with the cam lobes. Now, that follower 43 in Figure 2, at least, is shown as a half-circle directly in contact with the top part of the red colored cam. This follower, which is connected to a rocker arm 42, causes
462 the arm to pivot, and as the rocker arm is connected to the casing of the timing mechanism it opens and closes the movable breaker contact 41 with the fixed breaker contact 39. Therefore, I think we are safe in saying that at least as far back as September 11, 1917, the date that the Heaslet Patent was issued, that the engine art and the ignition art very well knew of the use of a mechanism for adjusting a timing cam automatically, which mechanism included circular weights mounted on a fixed part connected with a timing shaft, and show the circular weights

in there connected with a timing cam which operated a follower and a breaker contact.

I would like to direct The Court's attention to page 18 this time, wherein I show a chart which is labelled as follows: "*Defendant's Chart Showing That it is Old to Form a Timing Cam on a Centrifugal Weight and to*
463 *Pivot the Weight on a Part Fixed to and Rotated with a Shaft Geared to the Engine*, as disclosed by *Farwell*, 816,083." On this particular page I had reproduced the three sheets of drawings from the Farwell Patent, and also had reproduced parts of the specifications which appear in the lower left-hand of this page and are surrounded by a border of black lines. Now, Farwell discloses, broadly speaking, a rotatable shaft *A*, which I have colored in blue, and this part as a fixed part *A Prime*, which I have colored in yellow. Carried by the fixed part are circular weights which I have colored green and which can be seen in Figures 4, 5, 6 and 7 as being colored in green. In addition, Farwell discloses a cam surface C4, which I have colored in red, and it is part of or fixed with the circular weight *C*. It is the weight on the left-hand side of Figure 6 and Figure 7. The way this follower device operates is that he provides a top cam plate which I think is labelled *D*, capital *D*, and this plate is provided with a cam section which is small *d*—I am referring now to Figure 3 of the Farwell drawing—there is a follower *E* which is a roller which makes contact with the periphery of this plate capital *D*, and as the camplate *D* rotates because of the rotation of the timer shaft *A* the follower contacts the cam surface *D*
464 once each revolution and causes the movable breaker point *e* to make contact with the fixed breaker point *f*. And that also is in Figure 3 that I am referring to. In-

Page of Transcript

cidentally Figure 2 illustrates the breaker points in their closed position. You can see in Figure 2 the follower *E* is in contact with the cam *d*. Now, the function of the weights which I have colored in green is to cause the cam surface C4, which I have colored in red, to extend out beyond the peripheral edge of the plate *B*, and I think in Figure 1 we can see the cam C4 which I have not colored in red, incidentally, in Figure 1—in contact with the follower roller *E*. And my understanding is that the reason for this cam C4 is to increase the length of time during which the breaker points are kept closed. The engine spark is caused at the time that the follower *E* leaves the cam *d* or C4 as the case may be; so that the spark is advanced or retarded in accordance with the location of the red cam surface C4. The reason I have brought out this patent is to show that the art knew at least as far back as March 27, 1906, which is the date of the issuance of the Farwell Patent, that it could form a cam surface on a centrifugally operated weight, and that the cam surface could be made to move with the weight,
465 in this case directly in response to centrifugal force because it is part of the circular weight. And I might refer back to the Madle structure as shown on page 1 where in Figure 7 the same general concept is shown, that of a weight shown in green having a cam surface shown lightly in red fixed to the pivoted cam and part of the circular weight. Incidentally, in Figure 8 of the Farwell structure, which is the figure on the right-hand side of page 18, there is shown a structure wherein four followers and four sets of breaker contacts are used in order to adapt this device for multi-cylinder operation, so we can see that Farwell planned his device for either single or multiple cylinder operation. The operation of the ignition system above and beyond the timing mechanism,

Page of Transcript

which I have just disclosed, is I think in accordance with the subject matter we are considering now in the Madle Patent, and therefore, will go no further with it.

I would like to refer next to page 20, skipping page 19 which I will come back to shortly. Page 20 is labelled: "Defendant's Chart Showing *That Ignition Timers Consisting of a Tubular Type Cam Carried by a Timer Shaft, and Adjustable by Means of a Centrifugal Weight Pivoted on a Part Fixed to the Timer Shaft, is Old,* as
466 disclosed by *Prior Art Patents on Distributors.*" Now, in the automotive ignition system art there is a device known as a distributor whose general function is to make sure that the spark plugs in the engine spark when they are supposed to spark. Now, referring to the patent to Davis, 1,983,072, issued December 4, 1943, we can see a timer shaft 24, which I illustrated in blue in Figure 1, Figure 7 and Figure 11. Incidentally, I have selected these figures from the patent because of their illustrative values and because they show the structure quite clearly. There are very many other features in the patent which I simply omitted in my chart. As I mentioned, the timer
467 shaft is shown in blue. Affixed to the timer shaft is what I choose to call a fixed part, which has a yellow color, being rotated with the blue shaft. And carried on this fixed part are a number of circular weights 43—referring to Figure 7, that is—which are colored green. Figure 7 and Figure 11 are not quite the same mechanism, there is a slight difference between the two, and I will bring that out afterwards, but right now I will restrict myself to Figure 7. The green weights are circular weights which correspond to the arcuate arms of the Madle Patent, and are so designed that when the shaft which is colored blue rotates quickly the weights swing out due

Page of Transcript

to centrifugal force around their pivot points 42, to which the two springs which are zig zag black lines on Figure 7 are connected. The movement of the weights radially away from the blue shaft rotates the horns which are colored orange and to which is connected a tubular-type cam. The tubular-type cam is shown in red. And referring to Figure 1 for a moment we can see in cross-section a tubular-type cam which is slipped over the end of the timer shaft. Now, as the weights pivot outwardly and engage the horns, the weights are restrained by the springs I have just mentioned, but eventually will over-
468 come the springs to some extent and swing outwardly rotating the light-orange horns, thereby rotating the tubular cam shown in red relative to the blue shaft. Now, in order to restrict the cam in its motion you will notice on Figure 7 colored in orange a round spot which is labelled 151. This round spot represents a pin which is connected to the horn and which fits within an opening 155, which is the figure with the dashes around it in the fixed part so as to limit the amount of movement which may be imparted to the horns and to the attached cam. I mentioned that Figure 11 was slightly different than Figure 7, and the difference I mention was solely in the manner of the stop-pin or limiting means which in the case of Figure 11 consists of a pin 244 which slides within an opening or slot 251 in the yellow fixed part. The reason that I show this point of difference is that I want to show that the distributor, which is the art of automobile ignition systems, was well aware of the problems of advancing and retarding sparks and of advancing and retarding sparks by means of a tubular-type cam carried by and it may be on a cam shaft, and which cam is adjusted by means of centrifugal weights which are pivotally connected to a fixed part rotated with the timer shaft. And

I think the patent to Davis clearly brings that out and
469 shows that that structure was known at least as far back as July 14, 1932, the date of issuance of the Davis Patent.

The patent on the right side of page 20, Hardman, is for all practical purposes the same as the Davis Patent. And when I say the same, I mean it shows the use of a fixed part colored yellow connected and mounted on a blue shaft and rotated with the shaft. It also shows weights or arcuate arms which are colored green, which are pivotally connected to the yellow fixed part and which operate horns 87 and 86.

Now, in each of these cases the distributor is made for multiple-cylinder egines. That is, it is made to operate in an engine which has more than one cylinder and accordingly the cams are provided with a number of
470 lobes. However, I think it is apparent that the number of lobes would be dependent upon the number of cylinders of the engine, and that there is no reason whatsoever why the devices of either Davis or Hardman should not be used on either a one cylinder engine or a multiple-cylinder engine remembering, of course, the correction of the number of lobes on the cam.

Now, I would like to refer back to page 19, wherein I have a label which reads as follows: "Defendant's Chart Showing *That it is Old to Operate an Ignition Timing Cam at One-Half Crankshaft Speed and to Adjust the Cam by Means of Centrifugal Weights Pivoted Upon a Part Fixed to and Rotated with a Cam Shaft*, as disclosed by *Examples of Prior Art Patents*." Now, in view of the fact that Claim 5, which is in issue, does not concern itself with a feature of operating its timing mechanism at one-half crankshaft speed, I think I can discard any discussion of that, other than saying

Page of Transcript

that should that question ever arise it is a very old feature as shown in the three patents on this page. Incidentally, I would like to limit my discussion to the fact that these three patents are examples I have selected from a bundle of prior art patents as being a fine illustration of a number of different ways of adjusting—that is, of advancing
471 or retarding a spark by means of a centrifugal-type weight. These weights are frequently called governer weights, incidentally.

Referring first to Churchill, which is Patent No. 863,151, and on the left side of page 19, we can see a pair of green colored weights 38 in Figure 1 and Figure 4. The weights are on a rotatable part which is rotated by means of a gear which can be seen in Figure 1, which engages a gear 18 carried by the engine shaft 15, also referring to Figure 1. Now, as the rotating part or weight carrying gear rotates, the weights shown in green tend to swing out relative to the axis of rotation, which I have shown as blue, and which designates a screw 23. The movement of the swinging weights is restricted by stop-pins which I have colored orange and which in Figure 1 are designated as 49, 50, 47 and 48. Now, the actual cam, if I can stretch the expression cam for a moment, consists of a stud 45 which I have colored red, and which appears in Figures 1, 3 and 4. The stud 45 is directly connected to the green weights by means of horns 39, as seen in Figure 1, and rotates slightly off of center of
472 rotation of the fixed part along with the weights. The way this device operates is that every time that stud comes around and strikes a spring 28, which I have shown in yellow, that spring 28 flies back to close the breaker contact, which I think is designated as 30 in Figure 3. Now, this structure is pertinent to the Madle device in-

Page of Transcript

sofar as I mentioned before it shows that the use of a centrifugal type weight for an engine ignition timing mechanism was well-known at least as far back as August 13, 1907, the date of issuance of the Churchill Patent. Now, the cam structure, of course, is not quite the same as that shown in the Madle picture, but it has a stud or cam which is carried by the weights and which is connected to the weights and which moves with the weights to strike what might be termed the follower which is the yellow spring.

Now, going to the next patent which is in the center of Chart 19, which is a patent to Riker, 906,290. This patent shows a gear *p*1, which I have colored light blue, which is a gear driven from a gear *p* located on the engine crankshaft. The gear *p*1 carries a number of centrifugal weights *p*4, which I have colored green in Figure 2 of Riker. The weights are pivoted to the gear at *p*6 which is at the top and bottom of the blue gear in Figure
473 2. Thus it can be seen that rotation of the gear causes the weights *p*4 to swing outwardly away from the dark blue colored shaft *e*35, and that this swinging motion of the weights is transmitted by means of links *p*8 to horns or arms *p*9 which I have colored orange, to be ultimately transmitted to a cam. The reason I show this patent is strictly to show that a tubular type mechanism, which functions for all practical purposes as a timing cam, slips
474 over a camshaft and is rotated relative to that camshaft by means of centrifugal weights, is not new, and goes back to at least December 8, 1908, the date of the issuance of the Riker Patent.

Now, the last patent on this page which I would like to discuss is the patent to Packard No. 780,221, which appears on the right side of page 19. This patent dis-

Page of Transcript

closes a camshaft which I have colored dark blue, and which is designated in Figure 4 of the patent drawing by the numeral 43. Carried by this dark blue shaft is a centrifugal-type weight 45, which I have colored green. Now, it can be seen that as the shaft 43 rotates, the weight 45 tends to become normal, that is, it tends to operate at right angles to the axis of shaft 43, or tries to straighten itself out to become vertical in the drawing. This tendency of the cam to move in response to centrifugal force is opposed by a spring 46. Now, directly connected to this cam by means of link 48 is a collar 49 which is a member having a cam surface 50 which I show in red, the collar 49 being shown in light blue—and it can be seen that the red cam, because of its angularity, because of being sharply cut into a V, presents either more or less of a surface along the narrow point 42, which I have colored orange, depending upon the location of the red cam surface 50 relative to the narrow point 42. I think the
475 best way to explain the operation of this cam is that we have a spiral-type cam which terminates at a certain point. And the red part 50 filled in that point of termination. By moving the red part we have either more fill-in or less fill-in. Therefore, that length or shortness of length of the cam point engages with a follower 37, shown in Figure 1, which is a push rod 37, and it appears in both Figure 1 and in Figure 4. For example, in Figure 4 it can be seen rising vertically from the narrow point colored orange. Now, this push rod extends vertically and by means of a linkage first of all causes a magneto-type structure to trip and generate current, and consequently by means of additional linkage structure opens and closes contacts 19 and 16 which appear in Figure 1, 19 being the movable contact. Now, I don't want to go

into the magneto structure or the magneto disclosure of Packard because it has nothing to do with this case, but I would like to say it can be seen we have a push rod 37 which by means of considerable linkages causes a breaker to open and close. So that we can say that at least as far back as January 17, 1905, it was known to use a push rod type of followers and follower plungers to operate
476 breaker points, and that it was known to adjust the size of a timing cam surface in order to advance and retard the sparks by means of centrifugal type weights, which is shown in this patent in green.

Now, I would like to continue on page 21. On page 21 I have illustrated a chart which is headed "Defendant's Chart Showing *Miscellaneous Ignition Timing Devices Using Centrifugal Weights to Adjust Timing of Engine Spark* as disclosed by *Examples of Prior Art Patents.*" On this chart page 21 I have attempted to show very broadly that the use of centrifugal weights for adjusting timer mechanisms, that is, by the use of swinging weights per se for the advancing and retarding of engine sparks is very well known and very widely used with different types of cams and with different types of followers, and in fact in one patent without a follower at all. I will very briefly review these patents because I simply want to bring out the one point of the use of centrifugal weights.
478 1,427,718, is the one I am talking about. The patent to Brown shows a fixed part which is a white circle in Figure 7 connected with and carried by a timer shaft *C*, which is blue. And it also shows a cam plate 43 colored red which is slipped over and carried by the blue timer shaft, and which has a cam bump 44, which can be seen
479 in Figure 6 of the side view. I think if you will just follow Figure 7 which I have colored. Figure 6 is a

Page of Transcript

side view of that structure. The red plate is adjustable relative to the blue shaft by means of arcuate arms or weights 47 which I have colored green. It can be seen that the arcuate arms 47 are pivotally connected to the fixed member 45, and are connected with the cam plate which is colored red by means of links 48. Those links are the white bars that run between the weights and the red plate. The motion of the centrifugal weights is restrained by means of a coil spring 49, zig zag black line that appears on Figure 7. And it is also restricted by
480 means of a stop shown in orange—a little orange dot shown in Figure 7. Now, this particular timing device is used in a magneto mechanism which has a movable armature, and many other elements which are of no concern in this law suit. However, I simply want to restrict myself to that one issue of Figure 7, which illustrates the movement of a plate carrying a cam, and which illustrates, as I said before, that centrifugal weights are well known and widely used as governors or as means to adjust different types of cams and timing mechanism.

* * *

482 Now, I also have on the right-hand side the patent to Brillie, which is Number 857,715. This patent is illustrated for the purpose of showing the use of centrifugal weights colored green and labelled g in Figure 4 for
483 rotating one shaft relative to another shaft. Now, by rotating one shaft relative to another shaft what I mean is that this particular patent discloses a coupling between two shafts. One of the shafts is a magneto shaft and the other is a shaft which is engine-driven on an internal combustion engine. Now, the coupling between the two shafts causes both shafts to rotate together. However, in this type of structure it is desirable at times to change the angular relationship between the engine shaft d and the

Page of Transcript

magneto shaft a, and the way this is done is the engine shaft a is provided with protrusions or extensions, whatever you want to call them, c. They are little knobs which slip out of that and into a socket in the opposite shaft d. Now, what we have is the equivalent of two or more fingers c fitting in a slot, which are much wider than the fingers on the opposing shaft, for coupling purposes. And the fingers c are pushed or adjusted relative to the socket in the shaft d which is the engine shaft, by means of the centrifugal weights g which are colored green, and it can be seen that these weights are pivoted at f1 on Figure 4, and that they have noses which fit into the sockets and which noses abut up against the finger c, so the angular relationship of the two shafts can be changed. Now, the reason for bringing this out is this:—I'm afraid
434 I don't have the exact number, but there is a place where patents are classified as being one shaft relatively rotatable to another shaft. In other words, when we get down to this actual analysis the timer mechanism here, what we really have is one shaft which is hollow, that is the cam, and that one shaft fits over another shaft which may or may not be hollow and that is the timer or camshaft. And what we are doing is adjusting the angular relationship between these two shafts, and we are doing that by means of centrifugal weights.

And the question is, is this particular device shown by Madle an advance in the engine ignition arts, or such an advance in timing mechanisms per se? Now, because we know that this type of centrifugally-operated time mechanism is very old in the engine arts I think we can discount it as being an advance in the engine arts. And that, if anything, of itself, is a plain ordinary machine element. All it is, is a movement of one part relative

Page of Transcript

to another part in order to impart motion to a third follower piece. Now, correlating that I can say the cam of [Exhibit] 21c may be considered a shaft and the camshaft may be considered another shaft, and all that the
485 person who made Exhibit 21c is doing is changing one shaft relative to the other shaft. The fact that he may or may not use a certain type of follower is immaterial. What I am doing, is breaking this down into a timing mechanism per se and saying that is old. I am also saying that the follower mechanism was amply illustrated — the follower and breaker point mechanisms,—as I mentioned before in connection with the Smith Patent and the Kettering Patents and the Lefebvre Patents is very old. Now, if I refer back to my page 2, we can see that the follower mechanism in Smith — in other words, whether that follower 47 contacts a cam which is fixed or which is adjustable is really immaterial. The fact is that it causes sparking at a certain time and that the breaker points are accessible and that the breaker points are not in an oily zone. Now, the next problem is we can adjust that cam if we want to, because adjustment of the timing mechanism is certainly one of the oldest parts of the ignition arts as I have attempted to show throughout these various charts. Now, the combination of a follower and breaker point with a centrifugally adjusted cam is quite old, as shown in patents to Sturtevant and as shown in patents to Phelon. And, of course,
486 as I mentioned before, Sturtevant even shows making his breaker points accessible on the outside of the engine and his follower being inside of the crankcase in an oily area.

The Court: Do you have any of these patents as fully explained as the Madle Patent?

Page of Transcript

A. Your Honor, I don't think I can answer that yes or no. But to my mind —

The Court: Which comes the closest?

A. To my mind anticipation means I can take some or all of a patent and say everything in the claim in suit is in this patent. Now, I would hesitate [to say] there is no anticipation here, I would say every single element of these patents are old per se and the functions of every one of these patents are old and well known in the arts. The functions are old and well known in the arts, as shown by the illustrating patents.

The Court: Which patent do you think comes the closest as combining the elements that are in the Madle Patent?

A. I would say, Your Honor, that so far as I am concerned the Madle Patent does not show invention because of almost any patent we can find in this book of charts. I could not nail one patent down because I think it is so old that I would hesitate to say one patent shows the
487 whole structure, I would say that the art knew of these elements, knew of these functions, and knew of their results.

As I said before in my opinion the Sturtevant Patent shows more structure of the Plaintiff's Exhibit 21c than it does of the identical features of the Madle Patent, but I will try and read them together and see if I can
488 interpret them. Now, there is a preamble to Claim 5 which states — that is, Claim 5 of Madle Patent 2,605,753: "In an ignition system for a single cylinder four-cycle internal combustion engine of the type having a crankshaft-driven magneto for effecting sparkplug operation." Now, to me this is a preamble which sets forth the en-

Page of Transcript

vironment of the structural elements which will follow. Now, as it happens Sturtevant happens to have a two cylinder engine, and whether or not he has a magneto is something that is not mentioned so far as I can find in the Patent. Somehow or other he provides current. But this preamble I think can be disregarded because the file wrapper patents, for example the patent to Kettering which I mentioned was in the file wrapper and shows just such a type structure and certainly the preamble could not have been the novel feature. It could only be an environment in which the invention was described. Now, the claim calls for the following elements: "Fixed and movable breaker points accessibly mounted on the exterior of the engine remote from the magneto." There are fixed and movable breaker points shown in Figure 5 in my page 13 of Defendant's Exhibit 28, and these contacts are carried by the plunger 36 and by the anvil 35. "A cam follower movably supported by the
489 engine remote from the breaker points." Now, the cam follower would be follower 37 in Figure 5. "A motion transmitting connection between the cam follower and the movable breaker point." I think it is evident the follower is located on one end of the push rod and the follower is on the opposite end of the push rod. "A rotatable part adjacent to said cam follower." By rotatable part I would take it to mean the gear 25, which is shown in Figure 1 — that is, the large-sized gear. "A driving connection between said rotatable part and the engine crankshaft whereby the speed of rotation of the crankshaft determines the speed of rotation of said rotatable part." I think that is pretty obvious, the engine crankshaft gear 24 which is very slightly visible in Figure 1 at the top of drive gear 25. "A member carried by said

Page of Transcript

rotatable part for rotation therewith and for rotation relative thereto in response to centrifugal force." That, of course, would be the weights 42 which are colored yellow. "And a cam surface on said member engaged by said cam follower." This is where I had a problem. The cam surface which is colored red in my chart is actually carried by a plate 39, which is slipped over the timer shaft shown in blue. Now as it happens the timer plate 39 is physically connected to the weights 42 by
490 means of links. The links are also shown in yellow, Your Honor, in the same way the weights are. Now, in my opinion I would prefer calling the cam 38 and the cam plate 39 as being carried by the camshaft 26. But since they are physically connected to the weights I suppose it could be broadly stretched and say that they are a connected part to the weight. I really don't like that interpretation, I would prefer the interpretation that this structure of Figure 1 is the same as the structure of Plaintiff's Exhibit 21c, and that if I could read the claim on Plaintiff's Exhibit 21c by saying that the cam is a surface which is on the member by which I mentioned the arcuate arm—if I could say that then I could also say the same thing is true in Sturtevant's, and if Claim 5 reads on 21c then it also must be shown by the patent to Sturtevant.

• • •

512 I would like to refer to page A of Defendant's Exhibit 63 and at the same time refer to Defendant's Exhibit D-64, which is an artistic rendition of, or cutaway drawing of, Defendant's VS700 Engine. That corresponds with the engine right here, which I think is Defendant's
513 Exhibit D-8. The purpose of the Chart A was to show that the various elements which are disclosed in the

Page of Transcript

Lechtenberg '789 Patent with certain exceptions were used long before the Lechtenberg Patent application for Patent No. '789 was filed, in the Defendant's Model VS700 Engine. Now, the model VS700 Engine, looking at page A, consisted of a cast iron casting which contained or comprised the cylinder which I have properly labelled as *Cylinder* on the left-side of page A; and the crankcase, which I also have labelled by a word *Crankcase* appearing at the lower right-hand side of the page shown in page 8. Now, in this engine, referring to the picture, the wall to which appears at the right side, is labelled *Removable Side Plate*. And the reason this is so labelled is that while the crankcase is integral or in one piece with the cylinder there was an access plate which is removable and which I have labelled *Removable Side Plate*.

This is a model VS700 Engine, Defendant's Exhibit D-8, which I now hold. The crankcase and the cylinder — this is the crankcase and corresponds to the portion
514 labelled *Crankcase* in the drawing — the cutaway drawing of Chart A. And this is the *Cylinder* also labelled in the cutaway drawing. And the sideplate would fit on the end which is toward me when I am holding the engine in such a way that the gas tank is away from me and the carburetor and the filler is on the left side of me. This plate is removable, and happens to be cut away to make it a model. There is within this crankcase a boss which I have colored blue, and this boss functions for a bearing for the engine crankshaft which I also have labelled as a *Crankshaft*. Opposite this bearing there is
515 normally a removable bearing plate which can be seen as the crossection crisscross in Chart A. Now, if I may refer to the picture D-64, which is an artistic rendition

Page of Transcript

of the particular exhibit on the floor, D-8, we can see here there is a large boss which acts as a bearing for the crankshaft. Opposite that boss is another boss also shown in blue which functions as a support or top bearing for the crankshaft and happens to be on a removable plate. Along side is a low small boss which functions to support the rod or axle which passes through an opening in the camshaft, which I think is better labelled in my chart—Chart B of the Defendant's Exhibit 63. I have a part labelled: *Camshaft Supported by Bosses at Opposite Sides of Crankcase*. Now, when I talk about the camshaft being supported by bosses, or whether this device is actually made as the gear and the camshaft are formed together in one piece, or I suppose could be made in two pieces and put together, and the shaft is a hole so that it actually fits through the shaft and into the small blue bosses shown at the left of the large boss, and also the other small blue boss to the left of the top large blue boss. Now, the arrow at the lower portion of the crankcase and from which the bosses which are colored
516 blue extend upwardly, functions as an oil sump, that is, as an oil reservoir. And I also have that labelled in Chart B and in Chart A of Defendant's Exhibit 63 as *Oil Sump*. Now, in Chart A of defendant's Exhibit 63 I show, on the right side—I emphasize on the right side—by coloring red the opening which is labelled *Opening for Adding Oil*, and the *Opening for Oil Drain*. And I also added a note to this Chart: *Note That Openings for Oil Adding and Draining Break Through the Wall of the Sideplate*. Now, what I mean by that—I mean I will refer to physical Exhibit D-8, the portion of the sideplate which I am now holding contains the oil filter and oil drain plug. And the little filler plug has a flat

Page of Transcript

knob to which is connected a semi-threaded piece screwed into an opening, and at the lower end has a small dip stick which is labelled *Add*. The function of the dip stick is to indicate when to add oil. Right below that oil inlet opening and extending horizontally into the side plate is the oil drainage opening in which there is a nut which has a hex-head and which is screwed into the opening. Now, referring—referring back to Chart A of Defendant's Exhibit 63, we can see also colored
517 in red a portion which I labelled *Mounting Plate*. And I labelled it as follows: "The size of the mounting plate is determined by the standard size of the engine mount on the lawn mower or other machine to which this engine is to be attached."

Now, I would like to relate Defendant's Exhibit D-64, Defendant's Exhibit D-8, and Chart A of Defendant's Exhibit 63, with the disclosure of the Lechtenberg Patent. For that purpose for the moment I will refer to Figure 5 of the Patent to Lechtenberg. Now, on Figure 5 of the Patent to Lechtenberg we have a large boss —incidentally Figure 5 is a figure of a coverplate, and I think that is Plaintiff's Exhibit —

Mr. Jones: Is that Plaintiff's?

A. I will refer to the patent

Mr. Jones: 16b is Plaintiff's.

A. I am not a manufacturer, I can't tell.

Referring to 16b and also to Lechtenberg Patent Figure 5, we have a large boss on 16b which is designated
518 Number 156 in Figure 5. We have a smaller in diameter boss which is labelled 158 in Figure 5 of Lechtenberg. And the bosses come up from an area which is used as

an oil sump or oil reservoir. Now, relating that to Chart A, we have a boss shown in blue which corresponds to and similarly functions the same way as does the boss 156 in Figure 5 of Lechtenberg. We also have a camshaft supporting boss illustrated in blue in Chart B, Defendant's Exhibit 63. We—with a certain comment I will add, corresponds to the boss labelled 20 in Figure 5, that is the lower small boss in Figure 5. This boss, shown in blue in Chart B, which I was just referring to, is used to support the axle, and serves as a thrust bearing for the camshaft. In the Lechtenberg Patent this boss is used as both thrust and journal bearing, but I suppose broadly speaking you can say both of them—that is, the boss in the Lechtenberg Patent and the boss in Chart B both contribute to support the camshaft. Now, what I am trying to show here is this: I am trying to show that Defendant's VS700 Engine used a large boss—a pair of large bosses to support the crankshaft, and a pair of small bosses to support the camshaft, and that these bosses arose out of or came out of an area which is used
519 as a sump, and that there is a drain and filler opening for oil in close proximity to each other, which both open up in the sump area. In addition there is a mounting plate in the VS700 Engine, Exhibit D-8 and shown in my Chart, Exhibit 63, in the same way there is a mounting plate labelled 8 in Figure 5.

Now, taking the diagram shown in Chart A, I would like to say that when all of the parts are assembled as shown in the diagram we have an operative structure which is the full equivalent and which functions with the only exception of the small boss, in the identical manner as does the elements of the Lechtenberg Patent

Page of Transcript

when those elements are assembled, when the base is assembled to the block which consists of the integral crankcase and cylinder. Now, the VS700 Engine is cast iron, or was made out of cast iron, and I believe that that model of Exhibit D-8 is a cast iron engine. However, in reviewing the claims of the Lechtenberg Patent and searching high and low through these claims I never did come across, to my knowledge, the word aluminum. So that the material involved in this case could be anything, whether it is cast iron, aluminum or what-have-you, the claim don't specifically call for aluminum, and I don't believe Lechtenberg invented /an aluminum engine anyway, because aluminum is a well-known light
520 weight material which is used because of its lightness and is used for many purposes and for a long time in the engine art.

Now, the major difference that I can find between the Defendant's Model VS700 as embodied in the Charts A and B of Defendant's Exhibit 63, is this: The sideplate, which is removable in the model VS700, is not removable, but is an integral part of the crankcase in the Lechtenberg Patent. Now, Lechtenberg has provided an access opening, and what he does is, he cuts off the area which I have shown in red including the blue boss on Chart 9 and uses that as both his access opening and as his mounting plate. In the VS700 Engine shown in Chart A, the mounting plate is removably connected to the base of the crankcase. And I think I can show that referring to Defendant's Exhibit D-8. This circular red object at the bottom of the engine is the mounting plate. It is provided with bolt holes for the purpose of bolting the engine onto a lawn mower deck or on to the deck of whatever machine that is going to be operated by the engine. Now,

the mounting plate or circular object is bolted to the base of the engine by means of bolts. In other words there are two separate pieces here and the mounting plate may be removed if desirable and the engine may be directly bolted onto an object, that is, on a lawn mower without using the mounting plate. The mounting plate actually furnishes a good wide area for bolt holes. And the reason for that is that most lawn mowers are arranged to receive bolts spaced apart at certain distances and therefore, require a large round mounting plate. My observation is that the baseplae of the Clinton D-8 engine and the baseplate of the engine that was identified in this Court as the McCullough Engine, that is Defendant's Exhibit D-7, both function to accommodate bolts and to provide bolts for the plate to be connected to the lawn mower deck. As I said before, there is no reason why the plate cannot be removed, and the engine can be bolted if desired directly to the base of a lawn mower or whatever object, there are holes located on the lawn mower to accommodate the holes. Now, in order to illustrate that point, I am going to refer to another physical object.

The Court: Well, doesn't the 16b have the same bottom plate as 16d? Those two are the same, they have the same mounting plate, don't they?

A. I think I can show all three of them are the same. The VS700 Circular Base, the engine I am now holding, which is Defendant's Exhibit D-8, and Plaintiff's Exhibit 16b and Plaintiff's Exhibit 16d have the same mounting plate. Now, this VS700 Engine is adapted to be used with a vertical crankshaft or horizontal crankshaft and when used as a horizontal crankshaft and mounted on the end with the cylinder on top the mounting plate is not secured in the position shown in Chart A. And by

Page of Transcript

the same token the removable plate which I have labelled in Chart A is removed and the substitute baseplate is at
523 tached in order to mount the engine in a vertical position

I will return to the Lechtenberg Patent and comparing it with the disclosed material on Chart A of Defendant's Exhibit 63. Now, as I said, my observation in comparing the Chart A and in comparing a drawing or Figure 5 of the Lechtenberg Patent, was first of all that Lechtenberg removes the area I have shown in red and blue on Chart A and uses that as the access opening, and his opening to support the power take-off end of the crankshaft, and does not use the removable sideplate which is shown in this drawing on Chart A. In addition Lechtenberg uses a solid top wall, so far as I have been able to determine from the Patent, instead of the removable top wall here which I mentioned before was
524 crisscrossed in crossection. Now, I would like to bring out once again that each and every one of the elements in the VS700 which I have designated in these illustrations function and do the same job and produce the same results as are produced in the Lechtenberg Engine.

Now, I have heard the comment made that what Lechtenberg did, what his invention involved, was this—the comment I am going to answer is the one that was made by witnesses for the Plaintiff—that what Lechtenberg did was provide an engine in which one casting, which was expensive, contained all the constants—.

The Lechtenberg invention apparently is the location of constants—all constant elements which will not be changed, in one casting which is the expensive casting,
525 and the location of non-constant elements in relatively inexpensive baseplate. Now, in looking at this engine I am having, first, trouble locating that in the claim of

the Lechtenberg Patent, but most important I am wondering just what are the variables. I can find only one variable in the V8700 engine when I compare it with the so called variable part of the inexpensive baseplate castings of the Lechtenberg Patent. And that one variable I can find is the mounting plate—the size of the mounting plate. All pieces are all constant, there is nothing variable about the bases for the main part; but the V8700 engine shows a base which is the same as that claimed in Lechtenberg Patent. In V8700, referring to Chart B, shows a cam supporting boss which is the same as that shown in the Lechtenberg claims. And the removable mounting plate, which I suppose we could consider as a variable element, is present in the V8700 Engine, that is if this engine were to be used on a different size deck, the mounting plate would either be removed or would be treated differently, or in the alternative—I will end that there.

Now, continuing with my charts I would like to bring out first of all that the manufacture of an engine having an integral crankcase and cylinder is well known in the 526 engine art, as evidenced by the patents shown on page E of Defendant's Exhibit 63. What I have done on Chart E was to select a number of patents out of a bundle of patents, and selected these patents on the basis of their being good illustrations of the practice of casting an engine cylinder integrally with the crankcase. And the patents which I show here, and which I will not describe in any detail since I have colored the integral portions orange, and in each one of the patents except one I have cut out a part of the specifications and underlined that portion of the specification to show that the crankcase is cast integrally or in one piece with the cylin-

Page of Transcript

der. The patents which I show on this Chart E are Lutz, 2,606,541, Leja 2,559,079, Sawtelle, 1,242,985, Forster 2,404,833, Jacobi 2,157,666, Bakke 2,627,940. And these patents all appear upon page E which I have labelled "Defendant's Chart Showing *That Constructing Engines with an Integrally Cast Crankcase and Cylinder is Old in the Engine Art* as disclosed by *Examples of Prior Art Patents*". This Chart actually illustrates the principles which are illustrated by the Defendant's V8700 Engine, Exhibit 8 which appears before me. That simply shows that it is old to put integral casting crankcases and cylinders together, and I will not go any farther on this particular chart.

527 Now, I will refer to page F, Chart F, Defendant's Exhibit 63. In this chart appears the label, "Defendant's Chart Showing *That it is Old to Form an Engine Crankcase with a Removable Wall at the Power Take-off End of the Crankshaft* as disclosed by *Examples of Prior Art Patents*". Now, on this particular chart what I did was to select three prior art patents which show the concept of removing the wall through which the power take-off end of the crankshaft passes and to show the concept that in each case this removable wall functions as an oil sump, and is provided with a boss which serves as a bearing for the crankshaft. Now, I am not going into detail, I will simply read the names and indicate that in each of these patents I have colored in red the removable bottom wall. The patents which I have mentioned are Farr 2,357,942, Bosma 2,630,881, and Bakke, 2,627,940. The Patent to Bakke shows particularly well in Figure 4, which is the lower right-hand figure of Page F. The removable bottom wall, which is colored red, which functions as an oil sump and which is provided with a

boss which extends above the level of the oil and supports the crankshaft. Now, on this particular patent you will note there is a portion which is removable, so that the bottom, which is removable, on the Bakke
528 Patent actually sits on the red area, and in addition is provided with the red area; cover 19. Now, the red area, which I have marked on the Bakke Patent drawing, is provided with both accommodations. Referring to Figure 2 for a moment, which is the figure directly above Figure 4, we can see that looking down on a top view of the removable cover that on each of the corners is a circular opening which is provided for the purposes of using bolts or pushing bolts through the opening to assemble the engine to the deck of a lawnmower or other object. And I think Figure 1 shows the engine frame coupled to the deck of some object. Now, the reason I have set up Chart F was to show that the removability of that portion of the crankcase of the engine, which is located at the power take-off end of the crankshaft, is not new in the engine arts. And I would like to further emphasize my opinion that when the two engines are assembled, when the VS700 Engine is assembled and the engine of the Lechtenberg Patent is assembled, all of the elements are assembled and functioning in their respective and known positions and provide the known results, and that for the purposes of this assembly we know that there are prior art patents which I have shown as an example on Chart F, which show the removability
529 of the crankcase wall at the power take-off end of the shaft. I am of the opinion and understanding that the Bakke Patent, which is shown on Chart E and Chart F, illustrates both the removable power take-off plate and also the use of an integrally cast cylinder and crankcase.

Page of Transcript

The boss which I am now pointing to on Defendant's Exhibit D-8 is a relatively large-sized boss extending upwardly from the bottom of the crankcase wall, and it is provided with reinforcing fins, is in my opinion the equivalent or the same as the boss 156 shown in the Lechtenberg Patent. That boss on Exhibit D-8 serves and functions as a bearing for the crankshaft and also secondarily, because of its height above the bottom wall, functions as a means to prevent oil from leaking out of the oil sump through the port of the boss. Boss 156 of
530 the Lechtenberg Patent serves as a bearing or support for the crankshaft and also incidentally, so far as I can see in Figure 5, rises high enough above the level of the sump base so as to likewise prevent oil from draining out of the sump through the port in the boss. On the Exhibit D-8 I find a low boss, which is to one side of the high boss I have previously described, which corresponds to the boss 20 in the Lechtenberg Patent. The boss 20 of the Lechtenberg Patent functions to support the camshaft of the engine and acts as a journal bearing for the end of the camshaft.

531 Directing attention to Plaintiff's Exhibit 16a and these various covers appearing on panel 15, such as 15, 15a, 15b, 15c, 15d and 15e, and 15f, their primary use, so far as I can say, is to cover an opening in the crankcase wall and to support the crankshaft. I don't know the exact uses of each one of these covers. Those covers and
532 the baseplate shown in Exhibit D-8, which is integral with the crankcase, both primarily function as a side to close up the opening which would otherwise appear in
533 the crankcase. Now, one prior requisite of the cover-plate is, it must be large enough so it encloses the crankcase. So far as I can see, whether it was integral or bolted

on you still have a cover, you still have a wall, which would cover what would otherwise be an opening. After you have made that plate of sufficiently large area to cover that opening I imagine you may then cover the outside portion of the plate to suit your own convenience.

• • •

This portion of the patent to Felix No. 1,276,891, Exhibit D-66, discloses a removable end plate, and the disclosure is as follows, "One important feature of my invention is the removability of the main shaft and the two camshafts, without disturbing the other elements, and this is accomplished as follows: There are two removable end plates 36 and 37" — and I think we can see that in Figure 2 of the patent — "bolted at 38 respectively to and complementing the end plates 6 and 7, and at 39 to the ends of the cover plate, and each removable end plate has bearings for the three shafts mentioned," — I think we can refer to Figure 2 in the structure which I have just read. The patent further discloses: The camshafts having gears 35 beyond one end plate, the main shaft having a half-sized gear 34, and an idle gear 33 connecting them as best seen in Fig. 4. Examining Fig. 2 of the Felix Patent, Exhibit D-66, there is a bottom wall cover in that patent which is removable from the engine housing. That wall carries a bore for the crankshaft which projects through it. In this patent to Felix, I would assume that that bottom wall coverplate, indicated by the numeral 7 in Fig. 2, may be removed and replaced with a different sized cover plate so as you would have enough coverplate to cover the area of the open bottom, but I don't know. Whatever plate you replace plate 37 of Felix with, the plate must be big enough to fit over the opening, and must also have an opening through which the crankshaft can pass. And I would as-

Page of Transcript

sume that aside from that the plate could otherwise be made any size or shape outside of that area, I don't know exactly. No, as I recollect, having read it some time ago,
539 I never saw anything in the Felix Patent that would indicate it can't be done.

* * *

553 Referring to Claim 1 of the Lechtenberg Patent, there appears what I would call a preamble. It runs from line 69 to the colon at line 78. And I would think the claimed structure is that which follows the colon. The claimed elements, so far as I can see — and by this I am not attempting to point out the novelty, if any, claimed — "The cylinder and all portions of the crankcase including the wall thereof remote from and facing the cylinder, except that wall of the crankcase which carries the bearing for the power take-off end of the crankshaft is a single casting." To me that expression indicates an integral crankcase and cylinder which has an open wall at the power take-off end of the crankshaft. Now, continuing:
554 "And further by the fact that said wall of the crankcase which carries the bearing for the power take-off end of the crankshaft is provided by a cover secured to said casting." I will stop there. The second element in this claim is the cover element which functions apparently as a cover and which also functions to carry the bearing for the power take-off end of the crankshaft. I stop there because the subject matter that follows is what we would call a functional statement. Suppose I read that and show what I mean: "So that said cover is interchangeable with others of different design to adapt the engine to any of a variety of different installations without necessitating alteration of the cylinder-crankcase casting." Now, that phrase I have just read is a statement of use or function, or what have you, but it does not include

any positive structure in the claim. It does not add anything to the structure of the claim which precedes it, and I imagine since all it is is a descriptive element explaining the function, or explaining the purpose in great detail without going into any more structure I
555 imagine you could leave that off very safely and not affect the contents of the claim. Now, my statement as to preamble there, applies to the succeeding claims that are in issue in this case and which are included in that Lechtenberg Patent '789.

* * *

557 To alter Defendant's Exhibit D-8 to correspond with the structure of the Lechtenberg Patent '789, the removable sideplate of Defendant's Exhibit 8 would be made integral or one piece with the crankcase, and the bottom wall as the engine stands in this position with the cylinder horizontal would be cut off, and I think I should illustrate that by reference to my Chart A in Defendant's Exhibit 63, where I have colored in with red lines that
558 portion of the engine crankcase which could be cut off in order to obtain the same structure and the same type of structure as disclosed in the Lechtenberg '789 Patent. When the D-8 is modified in that regard, in my opinion Exhibit D-8 would then function and operate identically with the functioning and operation of the structure disclosed in the Lechtenberg Patent '789.

559 *Cross Examination*

* * *

566 A. In 21c I think I made it pretty plain that the cam surface was not on the arcuate arm. If I didn't make it plain, I would like to make it plain now.

Q. Didn't say about it being on the arcuate arm, it naturally moves along with the arcuate weight?

Page of Transcript

A. No, I wouldn't say that, either, because the arcuate weight responds to centrifugal force and moves outwardly on the axis of rotation of the camshaft, whereas the cam surface of this exhibit 21c, which is on the collar, moves radially to the camshaft. Now, that moves in
567 response to cam and not in response to centrifugal force.

• • •

569 Claim 5 of the Madle Patent does not define the specific type of movement made by the motion transmitting connection between the cam follower and the movable breaker point.

570 So far as I recall, in the Clinton Engine, which is the 2500 Engine, embodying the unit, Plaintiff's Exhibit 21c which I have in my hand, there is a driving connection between the crankshaft and the camshaft.

• • •

575 In the Clinton 2500 Engine embodying the unit Plaintiff's Exhibit 21c, there is a driving connection between the crankshaft and the camshaft. This driving connection
576 is a motion transmitting device. I think you are right, it is true then that a motion transmitting connection need not be a rigid connection. The connection between the cam follower and the movable breaker point in the Clinton accused engine, that is, the 2500 engine, is a motion transmitting connection, but not within the disclosure of the Madle Patent.

• • •

578 I don't know how the particular breaker cam inside of that magneto of the Clinton V8700 engine, Defendant's Exhibit D-8, is lubricated. I didn't check the magneto. I didn't know whether it was involved in this suit. I will say I have checked magnetos of the same type and there are apparently different types used; and

Page of Transcript

579 I did notice on one of these magnetos which I checked in the Clinton plant there was a wiper provided inside the magneto, and since it was not involved in the lawsuit and since it is not shown on my print and I made no attempt to discuss the magneto on the V8700 Engine, I can't say with surety exactly how that particular model D-8 is lubricated. The wiper is a common type of lubricating magneto cams.

It is true that the result performed by the Defendant's entire accused breaker point structure, as represented by an engine embodying the parts here as Plaintiff's Exhibit 21a, 21b, 21c, and 21d, is the same as that performed by the structure of the Madle Patent, because
580 the function of that breaking and timing mechanism advances and retards the sparks. Now, that function is performed in all of the prior art patents which I have
581 discussed yesterday. The function of the timing mechanism in these devices is to advance and retard the spark, and this is the same function in various prior art timing devices.

The Court: I don't think you need to add about the prior art.

The Witness:

Now, referring to the accused 2500 engine, it is true that in that structure the breaker mechanism 21d is located remote from the flywheel and in a position where it may be readily adjusted and replaced. In the same engine it is true that the moving parts are located within an oil zone of the engine where they are thoroughly lubricated. It is true in the same engine that the breaker mechanism, the electrical mechanism per se, is located outside of this oil zone.

• • •

Page of Transcript

587 As the Bakke patent is illustrated in my charts and in the patent drawing the crankshaft itself probably could not be able to be pulled out of the bottom along with the assembled bottom wall. Because in the patent drawings the opening, which I think is designated as 16 in which the adapting plate 19 fits, does not seem to be quite wide enough to accommodate the full construction
589 of the crankshaft. Now, it would be impossible to secure that in place in a structure such as shown in Figure 4 of the Bakke Patent. There is no way to reach in there.
590 To my recollection there is no showing anywhere else in the patent of a structure whereby that can be accomplished.

I went to work in the Patent Office in September, 1949. And left in September, 1952. During that time I worked in division 53. We were concerned with a class known as panels, partitions and closures, flexible and portable. The division itself handled several classes. I also handled several classes within the division. I handled class 160 which I gave the title of, Panels, Partitions, Enclosures, Flexible and Portable. Then I handled a class related
591 to article carriers, 224. I also handled Class 281, 282 and 283, which together deal with printed materials and manifolds of various types. That had nothing to do with engines.

FINDINGS OF FACT, CONCLUSIONS OF LAW, AND ORDER FOR JUDGMENT.

(Filed March 12, 1956)

Following the trial, filing of written briefs and arguments, and the making of oral arguments, the above-entitled case on December 21st, 1955, was submitted to the Court and by it taken under advisement. Ira Milton Jones, James R. Custin, and E. Marshall Thomas appeared as attorneys for the plaintiff. Thomas S. Donnelly and Hal F. Reynolds appeared as attorneys for the defendant. Now, to-wit, on this 12th day of March, 1956, the Court, now being fully advised in the premises, makes and enters the following Findings of Fact, Conclusions of law, and Order for Judgment.

FINDINGS OF FACT

1. The plaintiff, Briggs & Stratton Corporation, is a corporation organized and existing under the laws of the state of Delaware with its main office and manufacturing plant at Milwaukee, Wisconsin. The defendant, Clinton Machine Co., is a corporation organized and existing under the laws of the state of Michigan. Its main office is at Clinton, Michigan. It has manufacturing plants at Clinton, Michigan, and Maquoketa, Jackson County, Iowa. Jackson County, Iowa, is in the Eastern Division of the Northern District of Iowa. The plaintiff charges the defendant with patent infringement committed in this District. Jurisdiction is based upon Section 1338, Title 28, United States Code. Venue is based upon Section 1400(b), Title 28, United States Code.

2. The plaintiff and the defendant are among the leading manufacturers of light internal combustion gasoline engines and they are in keen competition in that field. The greater number of the engines manufactured by them are sold to manufacturers, assemblers, and distributors of rotary lawn mowers. They are placed on and attached to such mowers for the purpose of furnishing the motive power for them. The plaintiff concentrates upon the manufacture of a single cylinder four cycle internal combustion engine. The abbreviation V. S., as used in connection with the engines hereafter referred to, stands for Vertical Shaft.

3. The plaintiff charges the defendant with the infringement of United States Patent No. 2,605,753 issued August 5th, 1952, to Dorothy H. Madle, Administratrix of the Estate of Alain M. Madle, of which patent the plaintiff is the assignee and owner. That patent is hereafter referred to as the Madle patent. The plaintiff further charges the defendant with the infringement of United States Patent No. 2,693,789 and United States Patent No. 2,693,791 issued to L. J. Lechtenberg of which the plaintiff is the assignee and owner. Both of the Lechtenberg patents were issued on November 9th, 1954. The Lechtenberg Patent No. 2,693,789 is referred to as the first Lechtenberg patent and Lechtenberg Patent No. 2,693,791 is referred to as the second Lechtenberg patent.

4. The defendant in its answer sets up a number of defenses. The defendant also filed a counterclaim. In its counterclaim the defendant asks that it be declared that the patents relied on by the plaintiff be declared invalid for lack of patentable invention and that it be declared that the defendant was not guilty of infringement.

5. At a pretrial conference counsel for the plaintiff stated that in connection with the Madle patent the plain-

tiff relied upon Claims 2, 5, 6, and 10. At the beginning of the trial the plaintiff dismissed with prejudice as to Claims 2, 6, and 10 of that patent. As to the Madle patent the plaintiff relies upon Claim 5 thereof. That patent and claim will be first considered.

6. In gasoline internal combustion engines the mixture in the combustion chamber is ignited by means of an ignition system. Breaker points are a component part of that system. One of the breaker points is fixed and the other is movable. A spark is made at the time the points separate. It is necessary that the sparks be timed in accord with the speed and working of the engine.

7. Claim 5 of the Madle patent is given in the form set forth by the plaintiff. In the patent that claim appears without the breaks and numbers hereafter appearing:

Claim 5

In an ignition system for a single cylinder four cycle internal combustion engine of the type having a crankshaft driven magneto for effecting spark plug operation:

1.	fixed and
2.	movable breaker points
3.	accessibly mounted on the exterior of the engine remote from the magneto;
4.	a cam follower movably supported by the engine

5.

remote from the breaker points;

6. a motion transmitting connection between the cam follower and the movable breaker point

such that separation of the points is effected by motion of the cam follower in one direction;

7. a rotatable part adjacent to said cam follower;

8. a driving connection between said rotatable part and the engine crankshaft

whereby the speed of rotation of the crankshaft determines the speed of rotation of said rotatable part;

9. a member carried by said rotatable part for rotation therewith and for motion relative thereto in response to centrifugal force; and

10. a cam surface on said member engaged by said cam follower

for imparting motion to the cam follower in said direction once each revolution of the rotatable part to effect breaker point separation at instants depending upon the speed of crankshaft rotation and the position of said member relative to the rotatable part as determined by the centrifugal force acting on said member.

8. In the Madle patent reference is made to the following patents:

Number	*Name*	*Date*
1,224,247	Wacker	May 1, 1917
1,291,216	Smith	Jan. 14, 1919
1,463,958	Kettering	Aug. 7, 1923
1,636,017	Smith	July 19, 1927
1,736,431	Hendrickson	Nov. 19, 1929
1,904,368	Harmon	Apr. 18, 1933
2,013,541	Littlefield	Sept. 3, 1935
2,215,106	Letebvre	Sept. 17, 1940

9. The defendant gave notice of many prior art patents in connection with the Madle patent. It introduced into the evidence a substantial number, but not all, of the patents of which it gave notice. The following were the patents introduced into evidence by the defendant in connection with the Madle patent:

Number	*Name*	*Date*
740,781	Sturtevant	October 6, 1903
780,221	Packard	January 17, 1905
798,992	Cochran	September 9, 1905
810,963	Motsinger	January 30, 1906
816,083	Farwell	March 27, 1907
857,715	Brillie	June 25, 1907
863,151	Churchill	August 13, 1907
909,290	Riker	December 8, 1908
1,239,689	Heaslet	September 11, 1917
1,265,454	Kettering et al	May 7, 1918
1,281,204	Pitts	October 8, 1918
1,291,216	Smith	January 14, 1919
1,401,058	Erickson	December 20, 1921
1,427,718	Brown	August 29, 1922
1,430,524	Kettering	September 26, 1922
1,463,958	Kettering	August 7, 1923
1,465,644	Kettering	August 21, 1923
1,636,017	Smith	July 19, 1927
1,792,089	Hardman	February 10, 1931
1,983,972	Davis, Jr.	December 4, 1934
2,013,541	Littlefield	September 3, 1935
2,215,106	Letebvre	September 17, 1940
2,388,994	Phelon	November 13, 1945
Foreign Patent		
310,082	British	April 22, 1929

10. It is the claim of the plaintiff that an engine manufactured by the defendant known as V. S. 2500 infringed Claim 5 of the Madle patent. The defendant asserts that Claim 5 does not disclose patentable invention. It further asserts that the accused engine does not infringe that claim.

In the plaintiff's brief (pp. 6-8) the plaintiff states as hereafter set forth in regard to the invention defined by Claim 5:

> "The Madle patent relates to a magneto ignition system for a single-cylinder four stroke cycle internal combustion engine, and, so far as is material to this case, it refers more particularly to means for actuating the movable breaker point in such a magneto ignition system.
>
> "Without going into technical detail, the breaker points in an internal combustion engine comprise a pair of electrical contacts which separate or 'open' to cause a spark to jump across the spark plug electrodes. Since sparking of the plug follows instantaneously upon opening of the breaker points, breaker point opening must be timed quite accurately in relation to the rotational position of the crankshaft in order to insure that ignition of the fuel-air mixture charge in the cylinder will occur at the proper instant in the cycle of engine operation. (R. 183-184) When the engine is being started, the spark should occur relatively late in the cycle, near the instant when the piston reaches top dead center at the end of its compression stroke, but as the engine increases speed the spark should occur a substantial time before this top dead center position.
>
> "Mechanisms were known, even before the Madle invention, for automatically advancing the spark with increasing engine speed, and this was usually accomplished by means of a centrifugally responsive

mechanism which took advantage of the fact that the centrifugal force on a rotating part increases with increasing rotational speed. Prior to the Madle invention, however, all such automatic spark advance mechanisms had one or more of the following important disadvantages:

> "(1) An external lubrication system, separate and additional to that inside the engine crankcase, was required for the breaker point actuating cam and other rotating or rubbing parts in the breaker actuating mechanism. One conventional expedient for effecting lubrication was a wiper or wick at the exterior of the engine which required service from time to time. (R 578-579)
>
> "(2) The breaker points in single-cylinder engines were usually mounted behind the engine flywheel, that is, between the flywheel and its adjacent crankcase wall. Located in this position, the points could not be readily serviced or replaced. Access to the points usually necessitated removal of the blower housing and then detachment of the flywheel from the crankshaft by means of a pulling tool.
>
> "(3) The breaker point actuating cam was usually mounted on the engine crankshaft and therefore rotated at crankshaft speed, causing the breakers to produce an unnecessary spark during each cycle of engine operation.

"Madle's invention was the conception of a simple structure which not only avoided every one of these disadvantages of past mechanisms but in addition was efficient, compact and trouble-free. (R 187-188)

"By mounting the breaker actuating cam on the camshaft, instead of on the crankshaft, Madle was able to make the breaker points open only once during each engine cycle, eliminating the unnecessary spark which occurred with a crankshaft mount-

ed cam and which shortened the life of spark plugs and breaker points. By mounting the flyweight, which actuates the cam for angular movement, on the camshaft, Madle not only achieved simplicity and compactness, utilizing the camshaft for a dual function, but, more important, he disposed the rotating and rubbing parts inside the engine crankcase where they operated in a constant spray or mist of engine lubricating oil thus obviating the need for any external lubrication system such as the wiper or wick which had theretofore been considered necessary. And by employing a simple motion transmitting connection between the movable breaker point and the cam follower inside the crankcase, Madle was able to mount the breaker points in a readily accessible location on the exterior of the engine, where they would not be likely to have oil deposited upon them."

In the plaintiff's rebuttal brief (p. 6) the plaintiff makes the further statement:

> "Defendant has ignored two key phrases in claim 5 which point directly to the invention covered thereby. The breaker points are defined as mounted on the exterior of the engine '*remote from*' the magneto; and the cam follower is defined as '*remote from*' the breaker points. For a correct understanding of the claim, these expressions cannot be disregarded."

11. The question for determination is as to what patentable invention is shown by Claim 5 and the engine manufactured in accord therewith. Fixed and movable breaker points were not new. The advancing and retarding of a spark in proportion to the speed of the engine was not new. A camshaft driven at one-half of the crankshaft speed was not new. The placing of the breaker points outside of the crankcase and remote therefrom was not new. If Claim 5 is construed to be limited to a cam

and cam follower within the crank for actuating the timing mechanism so that the cam and cam follower would be lubricated (which is doubtful), such construction was disclosed in the prior art. A "cam follower movably supported by the engine remote from the breaker points" was not new. A "motion transmitting connection between the cam follower and the movable breaker point such that separation of the points is effected by motion of the cam follower in one direction" was not new. A "rotatable part adjacent to said cam follower" was not new. A "driving connection between said rotatable part and the engine crankshaft whereby the speed of rotation of the crankshaft determines the speed of rotation of said rotatable part" was not new. A "member carried by said rotatable part for rotation therewith and for motion relative thereto in response to centrifugal force" was not new. A "cam surface on said member engaged by said cam follower" was not new. In Claim 7 of the Madle patent, a claim not relied on by the plaintiff in this case, after referring to the cam, it is stated: "... said cam overlying the opposite face of the member so that the member is interposed between said cam and the arm to guide the arm in its swinging motion; ..." No similar statement occurs in Claim 5. In none of the prior art patents is the cam mounted on one side of the gear and the swingable centrifugally actuated arm on the other side of the gear. However, if Claim 5 be construed to include that feature, such location would be a matter of engineering choice rather than of patentable invention. It is not clear that the plaintiff claims that the location of the parts referred to constituted patentable invention.

12. The elements set forth in Claim 5 and contained in the plaintiff's engine manufactured in accord with

that claim were old and well known. However, the fact that all of such elements are old does not prevent them, when considered as a whole, from constituting patentable invention. After considering Claim 5 from that viewpoint, the Court is of the view and finds that Claim 5 is an aggregation of old elements which, in the aggregation, perform and produce no new or different function or operation than that theretofore performed or produced by them.

13. As heretofore noted, it is the claim of the plaintiff that the defendant's V8100 engine infringes Claims 1, 2, 4, 5, 6, 7, 8, 14, 15, and 16 of the first Lechtenberg patent, No. 2,693,789. That patent cites the following references to patents:

Number	*Name*	*Date*
1,447,245	Gore	Mar. 6, 1923
1,463,958	Kettering	Aug. 7, 1923
2,152,666	Jacobi	May 9, 1939
2,249,319	Lohner	July 15, 1941
2,256,002	Molnar	Sept. 16, 1941
2,305,186	Muenk	Dec. 15, 1942
2,375,718	Winkels et al.	May 8, 1945
2,404,833	Forster	July 30, 1946
2,424,416	Pirv	July 22, 1947
2,511,823	Klotsch	July 13, 1950
2,559,079	Leia	July 3, 1951
2,569,461	Dingman	Oct. 2, 1951
2,583,466	Brownlee	Jan. 22, 1952
2,590,134	Slonneger	Mar. 25, 1952
2,606,541	Lutz	Aug. 12, 1952
2,630,881	Bosma	Mar. 10, 1953
2,669,322	Brown	Feb. 16, 1954

Foreign Patents

Number	*Country*	*Date*
32,802	Netherlands	May 15, 1934

The defendant gave notice as to a number of claimed prior art patents in connection with the first Lechtenberg patent. It introduced the following into evidence:

Number	*Name*	*Date*
*1,242,985	Sawtelle	Oct. 16, 1917
2,157,666	Jacobi	May 9, 1939
*2,357,942	Farr	Sept. 12, 1944
2,404,833	Forster	July 30, 1946
2,559,079	Leja	July 3, 1951
*2,627,940	Rakke	Feb. 10, 1953
2,606,541	Lutz	Aug. 12, 1952
*2,346,148	Bosma	April 11, 1944
2,630,881	Bosma	March 10, 1953
*1,276,891	Felix	Aug. 27, 1928

Those marked with an asterisk were not included in the patents to which reference was made in the patent. Those not so marked were referred to in the patent.

Claims 1, 2, 4, 5, 6, 7, 8, 14, 15, and 16 of the first Lechtenberg patent are as follows:

[Quotation of claims omitted]

14. The plaintiff, following extensive experiments in January, 1953, placed on sale a die cast aluminum one cylinder four cycle air cooled gasoline engine. Soon thereafter the defendant brought out its VS100 engine which is the accused engine. The structure of the plaintiff's engine is in accord with the disclosure contained in the first Lechtenberg patent. The plaintiff's engine met and is meeting with marked commercial success. In the plaintiff's engine the crankcase and cylinder is cast as one integral unit. That unit is the main and most expensive part of the engine. Engines of the type here involved have a cover casting which is removable. In the plaintiff's engine the removable cover is at the bottom of the engine with the crankshaft protruding through it. Engines of the type here involved are designed to be

installed on other pieces of equipment to furnish the motive power for them. It is indicated that there are 36 possible uses to which engines of the type here involved may be put. Engines of the type here involved are installed on various decks or platforms of various types and kinds of equipment. The plaintiff's bottom cover casting is interchangeable with shapes of covers of different designs so as to adapt the engine to a variety of installations without any alteration in the cylinder crankcase casting. By using aluminum the plaintiff substantially reduced the weight of the engine. By die casting the plaintiff reduced the cost of the engine. By means of the bottom cover the plaintiff greatly increased the adaptability of the engine. It is clear that the plaintiff's engine is light, compact, reasonably priced, highly adaptable, and outstanding in its field. The question for determination is whether the structure disclosed by the first Lechtenberg patent discloses patentable invention, or merely a high degree of artisanship.

15. The casting of the cylinder and crankcase as an integral unit was not new. The die casting of engine parts was not new. The use of aluminum was not new. Having one wall of the engine removable was not new. Having the bottom cover of the engine removable was not new.

The patent discloses a separation of the bottom cover casting and the cylinder crankcase casting in such a way and manner that all of the constants are in the main and the more expensive casting and all of the variables are in the inexpensive bottom cover casting. That feature was not disclosed in the prior art and was new. The Court finds that such disclosure constituted patentable inven-

tion. Such disclosure appears more specifically and definitely in some of the claims than it does in others, but it more or less inheres in all of the claims.

16. The Court finds that the other disclosures in the patent did not constitute patentable invention in view of the prior art.

17. The defendant claims that in the prosecution of the application for the patent pertinent prior art was concealed from the Patent office. The Court finds that no pertinent prior art was concealed from the Patent Office in connection with the patent.

18. The defendant's engine VS100 is a striking copy and imitation of the structure disclosed by the patent. It is clear and the Court so finds that the defendant's engine VS100 reads on and infringes the claims in question as to the patentable invention found to have been disclosed by them.

19. The Court finds that there is no file wrapper or other estoppel which estops the plaintiff from asserting the claims in question as to the patentable invention found to have been disclosed by them.

* * *

29. The Court finds that the circumstances are such that no award of attorney fees shall be made to either the plaintiff or the defendant.

30. The Court finds that the circumstances are such that each party should be assessed one-half of the taxable costs.

CONCLUSIONS OF LAW

1. This Court has jurisdiction of the parties to this action and of the action.

2. Claim 5 of Madle Patent No. 2,605,753 is invalid as lacking in invention over the prior art.

* * *

4. Claims 1, 2, 4, 5, 6, 7, 8, 14, 15, and 16 of Lechtenberg Patent No. 2,693,789 are valid as to the patentable invention found to have been disclosed by them.

5. Lechtenberg Patent No. 2,693,789 was validly issued.

6. Claims 1, 2, 4, 5, 6, 7, 8, 14, 15, and 16 of Lechtenberg Patent No. 2,693,789 are infringed by the defendant's accused VS100 engine.

7. The plaintiff is entitled to a judgment against the defendant for damages and profits for such infringement and for an injunction restraining such further infringement by the defendant.

8. No attorney fees should be awarded to either party.

9. Each party should pay one-half of the taxable costs of this action.

ORDER FOR JUDGMENT

It is hereby ordered that judgment shall be entered adjudging, decreeing, and declaring:

1. that Claim 5 of Madle Patent No. 2,605,573 is invalid;

* * *

3. that Claims 1, 2, 4, 5, 6, 7, 8, 14, 15, and 16 of Lechtenberg Patent No. 2,693,789 are valid;

4. that such claims are infringed by the defendant's accused VS100 engine;

5. that the plaintiff have judgment against the defendant for damages and profits for such infringement, such damages and profits to be later determined with the Court retaining jurisdiction for such determination;

6. that the defendant be enjoined and restrained from such further infringement;

7. that no award of attorney fees be made to either party;

8. that each party shall pay one-half of the taxable costs;

9. that the proceedings under the judgment be stayed until April 16th, 1956.

/s/ Henry N. Graven
Henry N. Graven
United States District Judge

The above is a true copy.

Attest:

Lee McNeely, Clerk.

By

Deputy Clerk

JUDGMENT

(Filed March 12, 1956)

Following the trial, filing of written briefs and arguments, and the making of oral arguments, the above-entitled case on December 21st, 1955, was submitted to the Court and by it taken under advisement. Ira Milton Jones, James R. Custin, and E. Marshall Thomas appeared as attorneys for the plaintiff. Thomas S. Donnelly and Hal F. Reynolds appeared as attorneys for the defendant. On March 12th, 1956, the Court filed herein its Findings of Fact, Conclusions of Law, and Order for Judgment. Now, therefore, in accord with such Findings, Conclusions, and Order;

1. *It is hereby adjudged, decreed, and declared* that Claim 5 of United States Patent No. 2,605,573 issued August 5th, 1952, to Dorothy H. Madle, Administratrix of the Estate of Alain M. Madle, is invalid.

• • • •

3. *It is hereby adjudged, decreed, and declared* that Claims 1, 2, 4, 5, 6, 7, 8, 14, 15, and 15 of the United States Patent No. 2,693,789 issued November 9th, 1954, to Leo J. Lechtenberg are valid.

4. *It is hereby adjudged, decreed, and declared* that such claims are infringed by the defendant's accused VS100 engine.

5. *It is hereby adjudged, decreed, and declared* that the plaintiff have judgment against the defendant for damages and profits for such infringement, such damages and profits to be later determined; and that the Court retains jurisdiction for the making of such determination.

6. *It is hereby adjudged and decreed* that the defendant be and it is hereby enjoined and restrained from infringing those claims.

7. *It is hereby adjudged* that no award of attorney fees be made to either party.

8. *It is hereby adjudged* that each party shall pay one-half of the taxable costs taxed in the total sum of $.....

9. *It is hereby ordered* that proceedings under this judgment be stayed until April 16th, 1956.

Signed in the Northern District of Iowa this 12th day of March, 1956, for entry in the Eastern Division.

/s/ Henry N. Graven
Henry N. Graven,
United States District Judge

The above is a true copy.

Attest:
Lee McNeely, Clerk.

By
Deputy Clerk.

ORDER RULING ON POST-JUDGMENT MOTIONS OF THE DEFENDANT.

(Filed April 9, 1956)

On the 4th day of April, 1956, at the Federal Court House at Dubuque, Iowa, there came on for hearing the post-judgment motions of the defendant. Edwin J. Balluff, Arthur Raisch, Hal F. Reynolds, and Wayne G. Cook appeared as attorneys for the defendant in support of the said motions. Ira Milton Jones, James R. Custin, and E. Marshall Thomas appeared as attorneys for the plaintiff in resistance thereto. The said motions were then heard, submitted to the Court and by it taken under advisement. The Court, having considered said motions, is of the view that in litigation involving patents it is desirable the parties be given opportunity to present all of the evidence which they deem material or pertinent where the final decision will not be unduly delayed.

Under Rule 59 of the Federal Rules of Civil Procedure, in an action tried without a jury the Court may open up a judgment which has been entered for the purpose of taking additional evidence. The Court is of the view both of the parties should be given an opportunity to present additional evidence as to any or all of the issues as to all of the patents involved.

It is hereby ordered that the judgment heretofore entered on March 12th, 1956, be and the same is set aside in its entirety.

It is further ordered that both of the parties be and they are hereby given leave to present additional evidence as to any or all of the issues as to all of the patents involved in this litigation, including the issue as to infringement.

It is further ordered that the Court will hear such additional evidence at the Federal Court House at Dubuque, Iowa, starting on June 4th, 1956, at 10:00 o'clock A.M.

It is further ordered that save so far as the post-judgment motions of the defendant are not granted or rendered moot by this Order they are overruled and denied.

Done and Ordered at Dubuque, Iowa, this 9th day of April 1956.

/s/ Henry N. Graven
Henry N. Graven,
United States District Judge

The above is a true copy.

Attest:
Lee McNeely, Clerk.

By .
Deputy Clerk.

INDEX TO VOLUME II

Page

Supplemental Trial Proceedings— June 4-6, 1956

Evidence for Plaintiff

Hugh S. Brown
— Direct Examination 209
— Cross Examination 210

Harry Shore
— Direct Examination 212
— Cross Examination 225
— Redirect Examination 238
— Recross Examination 241

Evidence for Defendant

Deposition of Harold E. Bruns
— Direct Examination 243
— Cross Examination 250
— Redirect Examination 252

Stipulation 256

Clarence P. Damon
— Direct Examination 257

Stipulation 258

Clarence P. Damon
— Direct Examination (Continued) 260

Stipulation 261

Clarence P. Damon
— Direct Examination (Continued) 264

Stipulation 264

Clarence P. Damon
— Direct Examination (Continued) 267

	Page
Carl Wolcott	
— Direct Examination	268
— Cross Examination	293
Cletus V. Erlacher	
— Direct Examination	294
Clarence P. Damon (Recalled)	
— Direct Examination	322
— Cross Examination	335
— Redirect Examination	340
Rudolph L. Lowell	
— Direct Examination	341
— Cross Examination	364
Leo J. Lechtenberg (Adverse)	
— Direct Examination	368
— Cross Examination	385
— Redirect Examination	385
Rebuttal Evidence for Plaintiff	
— Stipulation	386
Leo J. Lechtenberg	
— Direct Examination	388
— Cross Examination	391
Harry Shore	
— Direct Examination	396
Harold E. Bruns	
— Direct Examination	397
— Cross Examination	397
Hugh S. Brown	
— Direct Examination	398
— Cross Examination	399
— Redirect Examination	402

Page

Deposition of Warren C. Conover
— Direct Examination 402
— Cross Examination 404

Joseph Robert Harkness
— Direct Examination 408
— Cross Examination 410

Ernest A. Longenecker
— Direct Examination 414
— Cross Examination 428
— Redirect Examination 432

Surrebuttal Evidence for Defendant

Clarence P. Damon
— Direct Examination 433

Harold E. Bruns
— Direct Examination 434

Cletus V. Erlacher
— Direct Examination 435

Re-rebuttal Evidence for Plaintiff

Ernest A. Longenecker
— Cross Examination 436

Findings of Fact, Conclusions of Law and Order for Judgment 438

Judgment 463

Notice of Appeal 464

Notice of Cross-Appeal 465

Relevant Docket Entries in District Court 466

Page

EXHIBITS

Defendant's Exhibits

D- 96 — Pages from H. H. Doehler: *Die Casting* 273

D- 98 — Pages from *Designing for Alcoa Die Castings* 283

D-105 — Article from *Southern Hardware*, January, 1951 297

D-109 — Reprint from *Electrical Merchandising*, June, 1951 305

D-110 — Reprint from *Electrical Merchandising*, January, 1956 313

Note: All patent copies are included in Volume III and are separately indexed in that volume.

Page of Transcript

SUPPLEMENTAL TRIAL PROCEEDINGS

June 4, 5, 6, 1956

• • •

22 HUGH S. BROWN

Direct Examination

23 My name is Hugh S. Brown, I am 59 years old, I live at 2020 Two Tree Lane, Wauwatosa, Wisconsin; I am vice-president in charge of engineering of the Briggs & Stratton Corporation in Milwaukee. I am the same Hugh S. Brown who has testified previously in this case. I have seen the motion picture which was just played in the court room, and which has been identified as Plaintiff's Exhibit 23 for identification. It was prepared 24 at the instruction of Mr. Jones. We at Briggs & Stratton arranged for its production, and I, in particular. I have had occasion to go through the factory of the General Maleable Company at Waukesha, Wisconsin. I went through every operation that was shown in the film. The film shown this morning accurately portrays the operations that I saw. The camera man went out to General Maleable with me and we went over it generally. I was not there when the picture was actually taken, but I told them what to take. The film shows 26 the conventional operations in the Briggs & Stratton plant. There may be changes from day to day, but that would show any reasonable day, let's say. The nature of those changes would be the changes on the lines or assembly. They assemble different kinds of engines different days, and different ways, different models; they are not all the same.

Cross Examination

With respect to the practices for sand casting the engine that was shown in the photograph, there were no deviations shown in the photographs which are not the
27 usual practice in sand casting those engines. I would say that movie correctly reflects the practice in connection with the sand-casting of that engine prior to the time of the Lechtenberg patent. There might have been minor modifications, but none that I would notice.

28 Now, with respect to the die-casting part of the film, the steps there shown do not reflect any deviation from the usual and customary practices of Briggs & Stratton in die casting its engine block. They vary with the methods in the assembly room but nothing else. As to the die casting, we have different kinds of machines, I mean, they would not be all exactly the same machines but they would use the same molds and everything. For die-casting the light weight engine I am not positive, but I think we have between twelve and fourteen sets of molds. There are also many other inserts that go with the molds, so to say how many in total we have, I could not be accurate on that. It is not necessarily the usual practice in our company, in the die-casting of these engine blocks, to produce all of the die-cast blocks for vertical shaft engines in one set of molds, and all of the blocks for a horizontal shaft engine in another set
29 of molds. At first they were made in the same molds. Part of the inserts were changed so we could put feet on or take them off at will. The movie didn't show the steps of changing the molds. The mold shown in the movie, for die-casting, was the vertical crankshaft engine only.

Page of Transcript

30 It is the usual practice of our company, in assembling these light weight engines, to run horizontal blocks and vertical shaft blocks down the same line. I wouldn't say it is alternately. The lines are provided so they can run either engine down any one they want to run them. The assembly lines shown in the movie show horizontal and vertical blocks alternately but I would say that we very rarely do it. Oh, they run them down mixed up, but I don't know whether they would have every other one. I mean, it might vary. I wouldn't say it is usual practice to alternate. And in assembling the cover to the blocks, as illustrated in the movie, you have covers which are especially made for that horizontal shaft block.

31 I should clarify that. It is possible to put on the horizontal cover on a horizontal crankshaft engine where the engine is going to be set in that position. I wouldn't say it was usual, no. It is not usual to put them on vertical shaft blocks. It is done, in the assembly of these engines, to put a cover for a vertical shaft block onto a horizontal shaft block, as a matter of practice, but that is not usual. The usual practice is the vertical shaft cover going onto the vertical shaft block, and the horizontal shaft cover going onto the horizontal shaft block. There were many

32 steps in the assembly of the light weight engine that were not shown in that movie, there were many of them.

Mr. Balluff: Well, Your Honor, I would like to renew my objection on the grounds stated, and in addition I renew the objection with respect to the die-cast movie on the ground that it does not conform to the usual practices of the Plaintiff, and in addition that there are many steps with reference to the assembly that are not shown in the photographs in the movie.

The Court: The objection is overruled. The relevancy of the testimony and the weight to be given will be matters to be determined by the Court.

33 *Mr. Jones:* I am not quite sure as to whether the Defendants admit the claims in suit read on the Defendant's structure. You remember we had quite some discussion at the rehearing, as I recall.

The Court: Well, the Court intended to relieve them of that stipulation. They may state of record what it is they claim — I mean, as Mr. Donnelly stated that if the patent was valid there was no question of infringement. I now understand they are questioning the infringement. Is that right?

Mr. Balluff: You are right, Your Honor.

---

34 HARRY SHORE

Direct Examination

My name is Harry Shore, fifty years old, live at 230 Cummings Avenue, Elberon, New Jersey, and I am employed as the Chief of the Bureau of Engineering Branch,
35 Power Source Division, of the Signal Corps, Engineering Laboratories, at Fort Monmouth, New Jersey. I have held the present position for the past two months. Prior to that time I was Chief of the Bureau, Unit Section, of the Power Sources Branch of the Signal Corps. I received the degree of Electrical Engineer from the Brooklyn Polytechnic Institute of New York in 1927. I received a professional engineer's license from the state of New York in 1931. Upon graduation from Brooklyn Polytechnic, I was employed by the Consolidated Edison Company of New York as an engineer in high tension

Page of Transcript

feeder transmission within New York City for that period was from 1927 to 1931. From 1931 to 1942 I was employed by the City of New York as an engineer in the Department of Transportation and was engaged in electrical signal designing for the New York City Rapid Transit System. From November, 1942, to the
36 present time, I have been engaged as an engineer in the Signal Corps Engineering Laboratories, primarily concerned with power unit work.

The Signal Corps is a prime furnisher of communication radar and meteorological equipment used by the Army predominately in tactical field operations. Necessary to insure the satisfactory operation of these equipments there must be furnished integral power sources furnishing electricity to operate these communications equipments and their electrical equipment. My responsibilities were concerned with research and development of the power sources composed of engine generating and motor generating equipment required to operate the communication and electrical equipment.

The Signal Corps to which I refer and by which I am employed is the United States Army Signal Corps. I am a civilian employee of the Signal Corps.

37 There are several types of prime movers that have been used in the field unit equipment, namely, internal combustion gasoline engines of the two-stroke and four-stroke cycle design, and diesel internal combustion engines to form the prime movers for powering the secondary movers or alternators and generators which provide electric power. I am concerned with these prime movers. The military is constantly striving to achieve equipments that will offer the greatest degree of relia-

bility under the most severe types of operating conditions that can be experienced, and in view of that consideration it is necessary to constantly contact the manufacturers regarding any improvements that they may have accomplished in advancing the state of the arts of such equipment to provide the degree of reliability necessary for military use. I personally keep myself informed of such developments by personal visits to various manufacturers in which indications have been made that they are prosecuting research or development and are in a
38 position to show advance of the state of the art, by direct contact, receipt of reports from the other military services in the Department of Defense, such as the Air Force, Navy, or other Army services like Ordnance or the Corps of Engineers. The only other government agency that I know of primarily interested in this field of small internal combustion engines is the United States Army Corps of Engineers and their respective engineering research and development laboratories located at Fort Belvoir, Virginia. Their effort to keep abreast of things is as great as our effort at the present time. I know that because the Signal Corps, being the biggest user of small engine generator sets for tactical field application, must of necessity be aware of any research and development activities undertaken by the other services, and constantly maintain liaison activity through
39 periodic visits to the service organizations and by inquiry made of liaison representatives from these services situated at Fort Monmouth.

I make constant visits to manufacturers of gasoline engines. The specifications requirements for an engine generator system is primarily dependent upon the type of application it will be put to in powering an end item,

Page of Transcript

namely, a communication radio or transmitter — radio receiver or transmitter or a radar set, and other electrical devices, based on the power requirements of these end item equipments and other characteristics concerned with the mode of operation under whatever type of field conditions or equipment is suited to operate for what period of continuous operation and other factors. The requirements for the power unit are then evolved and specification information is prepared and will include performance requirements to meet the needs of the application of the power unit source. These specifications are
40 prepared, or the information specification data is prepared, under my jurisdiction in my branch.

Within the Signal Corps Engineering Laboratory structure we have a maintenance division, responsible for the origin of the maintenance requirements, tabular parts list, stock numbering data, and other maintenance data concerned with the maintenance and operation of equipment in the field. This maintenance division constantly receives reports from the various theatres of action relating to the operation of the equipment, and basically these are in the form of unsatisfactory equipment reports which detail to the best ability of the operators of equipment criticism and observed deficiencies of operation of the equipment in the field. If unsatisfactory equipment reports are received by the Division which are of a repetitive nature, these reports are referred to my branch for an analysis and a review of methods necessary to effect corrective action in order to minimize and eliminate field deficiencies or failures. I have personal knowledge of such reports referred to my branch to the greatest extent possible. In other words, I have access at all times to these reports and the reports requiring the attention

and investigation of my branch are directed personally to me through proper correspondence channels. I delegate to engineers and technicians the various problems and to have them investigate and determine necessary measures of correction, whether they will involve a major redesign, and then take the necessary actions in advising the maintenance division of the corrective measures which must be effected; whether they can be effected in present equipment in the field or whether a design change or a specification change must be made in subsequent programs of equipment.

By virtue of the type of usage in the field where these equipments were being used during World War II, under all environmental conditions of cold, low ambient temper-
42 atures and high ambient temperatures, under rain and snow, humid conditions, a considerable amount of failure of small engines was brought to my attention, particularly in the carburetion and ignition system failures of the engine prime movers. In some cases where engines were required to start under low temperature conditions of operation it was — in many instances engines were difficult to start, and in certain instances as a result of this cold start of an engine they were damaged physically by the GI beyond the point of operation. In other instances where the humidity conditions were effective, corrosive action caused failure of breaker points in magneto assemblies preventing satisfactory ignition necessary to the successful operation of the engine. Such corrective action in many of the small engines, of servicing the breaker point assembly, was beyond the order of first or second echelon repair, or beyond the operator, and the equipment would have to be referred back to a fourth or fifth echelon repair to perform these maintenance repair

Page of Transcript

functions. But because of inaccessible design this could not be performed practically in the field.

43 During World War II a specification for cold weather starting of small internal combustion engines in itself was not used, but the requirements for cold weather operation were embodied in the specification for the prime mover or power unit. And the specifications at the time required the capability of the engine to be started in an ambient temperature of minus 25 degrees F. And after they started, to be able to operate at that temperature for long periods of operation. In some instances that specification was met. In other instances it could not be met repeatedly, and in view of the state of the art at the time waivers had to be granted in order to obtain equipment urgently needed. During the period of World War II, effectively '42 to '1945, research and development work was rather limited and deferred to a great extent because of the pressing need to obtain even commercial equipment with reasonable modification and make it as suitable as possible for military use.

45 In the period from 1945 onward my Branch instituted a program of internal and external research and development to attempt to improve the major or power unit equipment so that they would be more dependable for military application. Internal activity would be defined as that type of activity carried on within the Signal Corps Engineering Laboratory itself, using our own facilities and engineering and technical personnel to undertake programs relating to research and development in the particular related fields. External activity is one where the contracts would be given to educational and commercial industrial institutions and concerns with specific experience in the field involved to carry on a program

of research and development in the particular field we were concerned with. This program was carried on from 1945 to 1949. In this particular program on engine generator equipment, externally approximately three hundred and fifty to $450,000.00 was spent on engine development work and about $300,000.00 was spent on electrical generating development work. The Signal Corps spent that money. No, that was only for the external activity. The internal activity I could not give you exactly at the moment. The cost involved personnel consisting of approximately 35 people, both of engineering caliber and electrical technician caliber. Also a considerable expenditure of moneys in buying equipment and testing, experimentation; but in rough figures of the major test components and instrumentation I do remember spending about two hundred thousands on equipment. That was on the equipment, such as dynamic equipment and various electromagnetic electric testing instrumentation, used in the testing of engines and engine generating sets. Fifty percent of the activity of my men during this period was devoted to these particular fields. The fifty percent figure I gave was on the prime mover problem. That is the internal combustion engine.

46

Q

47

I personally instituted a patent search in the Patent Office in Washington, spending several days of my own time going over the field of carburetion and ignition system patents, and subsequent to that time in 1948 I sent one of my engineers to Washington for a period of approximately ten days to conduct a more extensive search of patents. And the result of the entire search did not disclose any patents which were related to and materially improved the state of the art. That preliminary search was not the first patent search I had ever

Page of Transcript

made. I had made several searches on elementary de-
48 vices, electrical regulators, mechanical regulators, mechanical governing devices. Now, in making the searches in connection with this search and development process on starting and operating development, we were interested in drawings that could be used to improve and provide greater reliability of starting and operating equipment when used in military application. We were not interested in the claims in those patents. The program disclosed nothing that gave us better equipment.

We were concerned with the problem up to the period of 1948, '49, and in the latter part of '49 Mr. Brown of the Briggs & Stratton Corporation made aware to me and to my Branch the programs that Briggs & Stratton had been carrying on in improving the ignition system, and they made aware to us a new automatic ignition system known as the Briggs & Stratton Magnematic
49 System, and furnished to the laboratory two sample Briggs & Stratton model 23-BS engines, incorporating the Magnematic ignition system, for the purpose of permitting the laboratories to determine whether this new ignition system was an improvement over the conventional flywheel, conventional magneto system previously
50 used. Exhibits 21c and 21d I recognize as components of the Magnematic ignition system. They are like the
51 ones I saw. From my examination of that brochure, Plaintiff's Exhibit 25, I would state that it contains a complete description of the ignition system that was presented to me and that I became familiar with under the name of Magnematic ignition system. There is nothing inaccurate about it that I know of, as a description.

Page of Transcript

52 Through our investigation and testing of the sample engines submitted in 1949 we were able to determine several advantages obtained in the new ignition system—the Magnematic ignition system, over the previous conventional flywheel magneto ignition system used in the Briggs & Stratton engines and also to be found on other manufactured single-cylinder flywheel magneto systems. These advantages I am talking about relate to starting and dependability of operation. As far as the normal operation of the engine, we found through extensive testing, and which was later borne out in field usage of new equipment, that the sparkplug life had been increased from 100-125 hour average life to a 200 to 250 hour average life, representing a 100% increase in spark-
53 plug life. I believe two important factors contributed to increase sparkplug life. One was easier engine starting, avoiding the necessity of over-choking the engine or combustion chamber which would result in excessive carbon deposits which would ultimately lead to short plug-life, and the other factor was that in the new ignition system by the use of a camshaft gear operated [at] one-half engine speed you reduce the number of sparkplug firing cycles by one-half and only providing a spark required for the necessary firing of the engine for the power stroke.

One of the most important advantages in the system was the location of the breaker point assembly externally to the crankcase or the interior of the crankcase, located on an exterior wall of the engine, permitting great accessibility to a part of an ignition system which was highly subject to necessary adjustment and maintenance. Heretofore the breaker point assembly was located within the engine proper adjacent to the crankcase wall and in

Page of Transcript

close proximity to the flywheel itself. To get at the breaker point assembly represented a disassembly problem which could not be done in the field, represented a
54 great deal of time-consuming action and in many instances because of the inaccessibility of the breaker point assembly in the field many equipments were not capable of starting because of the accumulation of a slight oxide film on the breaker points when the equipments had not been in use for a period of time; and with a simple cleaning of these points could have provided a satisfactory ignition system effecting starting of the engine. Now, as I said, with the new system, with the breaker point assembly placed on the outside of the engine, giving the greatest degree of accessibility, it was a relatively simple matter to examine the points, clean the points, and make an easy adjustment of the points and provide a greater degree of reliability of operation and starting of the engine.

One of the most important features in the new system was the feature of an automatic advancing and retarding of spark which up to that time had not been disclosed or used in single cylinder small lightweight engines. Using such an engine in the field and at low temperatures from zero degrees downward an engine is very difficult to start. Your cranking coming-in speeds are relatively
55 low and by virtue of the low speed during the cranking cycle it is very difficult to fire an engine, effect proper combustion in the combustion chamber to get the engine up to normal operating speed. In cases where you have a fixed timing of the breaker points, which normally would be designed for the basic operating speed of an engine, and you attempt to start an engine at low speed, and can't accelerate that speed of the engine quickly—

you will get a mis-firing or kick-back. With the use of a retarded spark during the starting cycle this greatly helped the proper starting of the engine, permitting a proper firing of the engine, and aiding materially in starting and operating the engine, giving you an overall greater reliability. The coming-in speed is considered a minimum speed below which an ignition system will not provide the proper voltage to fire across the spark-plug, giving you the necessary combustion of the combustible mixture within the engine cylinder. As to the relationship between coming-in speed and low ambient
56 temperature, as I explained before in low ambient temperature conditions where the lubricating oil tends to become viscous and your frictional parts sluggish, there are more difficulties in cranking an engine at the desired coming-in speed to effect proper ignition and starting of an engine.

One of the important features in this Magnematic system was that those frictional parts requiring lubrication were appropriately located within the crankcase of the engine, and those parts, like the breaker point assembly which did not require lubrication, and as a matter of fact at times would be seriously affected by a lubricating oil, were most appropriately placed outside of the engine.

"In the earlier designed engine, Model ZZ, Briggs & Stratton engine, the sparkplugs had to be partially shielded against the lead deposits and temperature prob-
57 lem involved in the design of the overall unit and the ignition system. Where in the later model Briggs & Stratton engine, the Model 23 engine, the sparkplug was more advantageously located within the cylinder head to provide a better means of firing and enhancing the life

Page of Transcript

of the plug. Several reasons brought about this better location of the plug. One reason was the fact that you obtained a spark once every two revolutions of the crankshaft instead of one spark every revolution, reducing partially the temperature condition within the sparkplug area or sparkplug well area, a type of spark advancing during the starting period of the engine, also aided in designing the location of the plug more appropriately than in the previous models.

There was another advantage. All of our equipments are required to be wired against radio interference, which could affect our communications and electronic equipments. It was found that the suppression application of the newer engine was simplified materially by the change
58 in the design of the ignition system.

As I mentioned before, we made tests on the sample models furnished to the laboratory in 1949 and in subsequent years, 1951 onward, where—for Signal Corps use more than 30,000 of the Model 23-BP Briggs & Stratton were procured. Invariably life tests of 500 hour duration, and other environmental low temperature, high temperature and humidity tests were conducted on these equipments using the Magnematic ignition system. In the course of testing out low temperatures, ranges of temperature minus 25, minus 30, minus 40, degrees F., we found decided improvement in the starting characteristics of the engine using the new ignition system. Starting was much easier. We found that the coming-in speed during cranking was on a lower order in rpm than the coming-in speed necessary for the older ignition system, which was about 200 to 225 rpm. For that reason, where cranking was difficult at low temperatures and where you could crank an engine at lower speed and

Page of Transcript

have it coming in and firing properly, that was a decided
59 advantage.

I was particularly interested in trying to make a comparison of field usage and unsatisfactory equipment reports primarily of ignition systems, and I made an investigation recently of the extent of unsatisfactory equipment reports on the new engines where a considerable number of them had been used in Korea during the Korean war period of 1952 to '54, and I was not able to find one report relating to ignition system failure. I found no unsatisfactory reports on the starting difficulties of those engines. Engines incorporating the Briggs & Stratton Magnematic ignition system have been used world-wide. We have been all over the world, in Europe, in the Pacific theater, Japan, Korea, in the Arctic, and in tropical areas like the Bahamas and South America. They are used all over.

The drawings of the patent to Madle, No. 2,605,753,
60 positively do relate to the Magnematic ignition system about which I have been testifying. I would like to state that insofar as a single cylinder four-stroke or two-stroke cycle engines, there were none that had any ignition system comparable to the one that was made known to us in 1949. None of them had those advantages about which I have testified. That answer relates to the patent I have in my hand, No. 2,605,753, and particularly to the drawings thereon.

If such an ignition system had been in existence prior to our learning of the Briggs & Stratton Magnematic
61 ignition system we would definitely have been aware of it, either directly through our own activities in the Signal Corps where we were making personal contact with

Page of Transcript

manufacturers, also in keeping abreast of the activities carried on by the other services in this related field.

We also made high temperature tests on the engine having the Briggs & Stratton Magnematic ignition system. Part of our specification requirements had called for an engine to be capable of starting in an ambient temperature of plus 125 degrees F. and continuing to operate in such an ambient temperature for a minimum period of two hours without undue temperature rise of any of the engine parts which could result in premature failure of the engine. We made such tests repeatedly on various prime contractor's contracts to supply the engine generator set known as PE-75 generating set, which comprised a Briggs & Stratton six horsepower engine and a 2.5 Claywood single phase 60 cycle AC generator furnished by several electrical manufacturers. That six
62 horsepower engine, being Model 23-BP, uses the Briggs & Stratton Magnematic ignition system. The high temperature test at all times indicated that the engine could perform satisfactorily. Further tests, humidity tests were also conducted to determine if the system when subjected to humid conditions experienced in the field would be subject to corrosion and degradation resulting in failure, and it was determined that the improved features of the system using a molded coil as against a previously impregnated type coil, was superior in resisting corrosive attack of moisture absorption.

63 *Cross Examination*

Naming the elements of the Magnematic ignition system, the first element is the conventional flywheel magneto located on the crankshaft in a similar manner to previously used flywheel magnetos. The next element

Page of Transcript

is a pinion gear on the crankshaft which engages with a camshaft gear to drive a camshaft at one-half of the engine speed. On the camshaft is a cam which actuates a cam follower, and part of the cam follower is connected to the cam follower as a rigid body—rigid in relation to the cam follower itself is a motion-transmitting shaft which extends beyond the side wall of the crankcase and actuates the moveable breaker contact point of the breaker contact—the breaker contact assembly located on the exterior side wall of the engine. In addition to the breaker contact is a condenser in the primary winding system and a fixed breaker contact point that is part of the ignition system. There is also on the camshaft gear a means of advancing the cam through centrifugal action resulting from increased speed of engine rotation, which advances in the same relation the spark in the engine at the spark plug. The coil is part of the magneto assembly and is in this particular case a molded coil, and part of the coil feature is that the high tension lead is molded into the coil in a fashion to provide a very effective seal, minimizing and practically eliminating moisture entrance to the coil at the point of the high tension lead.

The Alnico magnets are located on the flywheel magneto rotor and are part of the basic electrical generating system of this flywheel magneto. These magnets, in conjunction with the winding of the coil form a basis of providing the electrical energy which is imparted to the spark plug to provide the necessary spark within the
65 combustion chamber.

Q. Were there ignition systems that you examined or had experience with previous using Alnico magnets?

A. Yes sir, there were—there were several ignition systems using an integrated type of magnet system mag-

Page of Transcript

netos. They were also used on a single cylinder flywheel type magneto. As far as the state of the art of Alnico magnets I could tell you this: That the Signal Corps was one of the prime movers in the development of permanent magnet generators, not only for ignition systems but for large power sources. And we were quite aware of the state of the art in permanent magnet use.

The location of the magneto on the crankshaft, the basic elements thereof, with the exception of the improved molded coil, could not be considered as possibly
66 new or novel. I knew of the magneto flywheel as such as going back during the early war period, 1941 and 1942, we were using such flywheel type magnetos. The crankshaft that drives the camshaft here was known prior to 1940, but we didn't find it as an application for ignition systems. It was used for other purposes, for such things as a pump—a fuel pump or something, lubrication pump or other type of application, but it had not been dis-
67 closed to us for using this camshaft gear for ignition systems in a single cylinder engine. I restrict it to single cylinder engines because in the multiple-cylinder engines at most you may have a camshaft gear—a camshaft primarily designed as a power take-off device to be used for valving, for magneto ignition, and several other possible operations, a fuel pump, and other accessories. The reason why I confine it to single cylinder, we were not able to find such an application or useability for a single cylinder engine during the war. Usually in the multicylinder engine, by virtue of the increased size of the engine, you could use a complete magneto—an integrated magneto rigidly mounted to the engine in a fashion to—and by a distributor means provide the necessary function for multiple cylinders, but in a single cylinder en-

gine where you are fighting for space and size limitation and weight such an integrated magneto does not lend itself too well, if you are fighting for weight, size and
68 compactness. And that for military use is one of our big problems, keeping the weight and size of the overall equipment down as much as possible, and particularly if you are talking about small lightweight equipment of the order of one and two horsepower, definitely you could not tolerate anything other than a flywheel type of magneto which usually didn't necessitate additional space, could be made compact and lighter in weight than the integrated type of magneto used on the multiple cylinder engines.

69 The coil assembly as a molded coil had been used during the war. The idea of the art had not been previous to have enabled the use of a molded coil with the high tension lead so emanating from the coil to provide a very effective seal to prevent moisture entrance to the coil itself.

When I say molding a coil I mean casting it in thermoplastic resin. With new technics and the new scientific materials you are able to take the electrical coil and mold around the coil with the dielectric scientific materials to give you an effective seal. One of the biggest
70 problems in the war was that not only in electrical equipment used in engines but in all of our radio electric equipment effecting a complete seal to eliminate the entrance of moisture in such devices as resistors, vacuum tubes, transmitters. That was one of our biggest problems; and many concerns were in research development programs for effecting a means of sealing these components to eliminate moisture penetration, which could result in the breakdown and failure of the equipment.

Page of Transcript

By our own tests in the field and in the laboratories by the use of more than 30,000 of these units—of these in one type of unit with no unsatisfactory reports that I could determine relating to ignition failure, was definite proof that the molded coil was far superior to the previous impregnated type of coil.

The Court: May I address a question to counsel for the plaintiff? Does that appear in any of your claims?

Mr. Custin: Now if the court please, that coil situation is a little red herring that has started to enter through
71 this whole thing. I think I can bring it out that the coil has nothing to do with any of the other advantages to which this witness testified or any of the results derived had from this Madle invention.

The Witness: You don't find the molded material in the Madle patent. This molded coil is one of the components of several that were—you could say contributes to the improved performance that we obtained from engine operation.

I made a search through the patents in the Patent Office. I myself and the man I sent down subsequently to Washington in 1948 searched from 1948 as far back as possibly 1900 to try and see if there were any features
72 in any patents relating to ignition which could be used to give us an improved and more reliable type of ignition system. The patent would give us an indication as to novelty or features that would be possibly employed to give you an improved ignition system. As an example, the location of the breaker points outside of the flywheel magneto would be—if it had been disclosed to us in a single cylinder we would have considered it some-

thing to look into for further development and use for our need. Now, as a matter of fact you can't tell a thing about whether a device is worthwhile or going to fit the job until you have tested it. It is part of our work, with all of our engines, to test them very carefully for *many many* hours.

73 Not only single cylinder ignition systems use breaker points. The breaker points on the Model T were located outside of the magneto. They were located near the fire wall of the engine. I had occasion to examine them as far back as I can remember. I never owned a Ford but I knew people that did. Every boy that has used a Ford or owned one has worked with the breaker points. They were *very very* accessible.

74 Every advantage that flows from mounting the breaker points in a single cylinder engine outside of the confines of that engine also follows in the multiple-cylinder engine. Insofar as it related to the application to a single cylinder engine he did solve a problem, because prior to that time in our use, in our need, we didn't have the type of accessibility in a single cylinder engine that we enjoyed in a multiple-cylinder engine. We did look into multiple cylinder engines to get ideas for use in single
75 cylinder engines ourselves. We didn't have time as I mentioned, in the war years, we were restricted in the amount of activity we could place on development work ourselves because of the arrangement of using commercial items and attempting to use them as military equipment. Sure, we spent time on it but the way of placing breaker points on the outside and still maintaining the features or retaining the features of the flywheel magneto were not too obvious to us. They were not obvious enough to come up with the idea.

Page of Transcript

We were not manufacturing engines, but we were interested in engine development, as I stated before we made—the Signal Corps, my particular Branch, made some notable contributions to the permanent magnet ignition, we were studying all forms of ignition systems because we knew some of the problems we were encountering, and we were attempting to try and find an improved method. As I stated, we were vitally interested in what industry was doing and we even placed contracts with several manufacturers for simple light weight engines development particularly as relating to improved ignition and carburetion systems.

76 Prior to the Magnematic the breaker points about which we are talking, or the timer, were located within the flywheel magneto housing which was of course located within the crankcase of the engine.

Q. You mean, the magneto on the flywheel was within the crankcase?

A. It was on the crankshaft.

Q. Within the crankcase?

A. Within the crank — the flywheel magneto was on the crankshaft, and the breaker point assembly was on a plate affixed within the engine adjacent to the magneto itself and actuated by a cam action from the crankshaft directly.

Q. Do I understand the breaker points were located actually within the crankcase?

A. Within the crankcase, yes.

Q. That is where the oil for lubrication would splash all over them?

A. No, not in that portion of the crankcase where you normally would require lubrication, no.

Page of Transcript

Q. Weren't they located on a plate outside of the crankcase, isn't that a more correct description?

A. Possibly outside of the crankcase but still within
77 the interior of your engine housing, outside of the cylinder and crankcase housing.

So the oil from the splash lubricating system in the crankcase never reached the breaker points, unless at times where you had seal problems and you have defective seals. Normally you wouldn't have too much seal problem. The
78 breaker points were confined within the shroud that covers the cylinder and crankcase. Madle locates them on the outer face of the crankcase. The breaker points perform the same function whether mounted on the outside of the wall of the shroud or within the shroud, or outside the crankcase and cylinder. The sparkplug and the ignition system doesn't care where the breaker points are located. The whole thing was derived from mounting the breaker points on the outside of the shroud is when they have corroded, or become defective — or need adjustment, you can reach them easier. They are more accessible. That same benefit
79 flowed with respect to this Model T Ford.

In cranking the Model T Ford there was a spark advance control lever on the steering column right under the steering wheel. When we went out to crank it so we wouldn't get our arm broken by a kickback it was put into a — as I remember — or pulled downward action. That is retarding the spark. So the spark occurs near dead center. That means, that you want the combustible mixture compressed in the cylinder to be ignited when the piston is at the top of its compression stroke and the crankshaft is on about dead center. After you got the
80 engine started you would have to advance the spark advance lever to give you earlier firing to give you suit-

Page of Transcript

able engine operation. Madle achieves the same objects through an automatic means, right. In other words, he does by centrifugal advance what was done in the Model T Ford by manual advance. A centrifugal spark advance was plenty old prior to 1940. Now, when it comes to getting an engine to fire, to start an engine in cold weather, ignition isn't the only problem or condition which is met, but it is one of the major problems, the ignition. Fuel induction, the type of fuel used, the type of lubrication used; there are quite a few related problems to starting. We have tried to start a single cylinder engine with some gasoline that stood over winter in a
81 gas can. It is an impossible job. Because normally the vapor pressure of the fuel is so low that you cannot derive the necessary volatility of the fuel effect combustion, and therefore it wasn't a winter grade fuel. For fuel used for low temperature operation you must have a high grade vapor pressure fuel to effect compression. The lubrication is also important. No material improvements were made in these Briggs & Stratton engines we tested with Magnetic ignition systems on them in the carburetion or carburetor of the engine over the ones previously used. The condition of the oil or the type of oil you have in an engine affects the starting. If you have an oil of high viscosity which adds to the frictional problems of starting it will make it most difficult to turn
82 over an engine crankshaft at reasonable speeds to accomplish starting, and therefor you use oils of low viscosity for low temperature operation. And as a matter of fact in our early war years where we had difficulty— where we were investigating problems of cold starting, we used to dilute our oil with gasoline, giving us a crankcase dilution, thinning out the oil to enable us to

Page of Transcript

effect starting. One of the biggest dangers of this crankcase dilution was that the lubricating properties of the oil were seriously diminished and we had quite a few engine failures due to neglect and the improper training on the part of our GI personnel to effect more oil changes than they normally would under normal temperature operation. So oil and its weight or its viscosity is an important factor in ultimate operation on starting. Now, the speed at which you crank an engine is also important. It is important to the point of—there are several reasons for it. One is, to effect a minimum speed in which the ignition system becomes sufficiently effective to produce the spark, and also the other important factor is to permit the proper fuel induction into the combustion chamber
83 which, together with the proper spark, will give you combustion.

As far as starting is concerned the engine will start just as well or just as poorly whether you locate the breaker points on the shroud outside the engine, or within the shroud outside of the crankcase. It is also true that your breaker points or your timer will operate just as dependably whether it is located outside of the wall of the shroud or inside of the shroud but outside of the crankcase.

The major difference between the Magnematic ignition system and one of the prior art is that of accessibilitiy in the arrangement, achieved by using a flywheel magneto and its relation to ignition system parts to give you greater accessibility of your breaker contact points which were
84 subject to higher maintenance and adjustment, and a means of incorporating a spark retarding and advancing feature to facilitate low temperature starting or starting

Page of Transcript

at low cranking speeds. Another point was that by the use of the camshaft operating at one-half engine speed, you reduce the number of sparks to only the one effective spark required during the power stroke of the engine, where there were required two sparks on each revolution of the crankshaft. The mounting of the breaker points on the outside of the shroud, had a relation to this driving of the cam on the camshaft so that you get a spark every other revolution of the crankshaft in this respect: That the cam follower actuated from the cam on the camshaft which opens or closes the moveable breaker contact, they have a definite mechanical design relation one to the other. In this respect the circuit breaker opens the primary circuit in which the current is flowing, causes induction into the high tension winding, or the secondary circuit, at a proper time, which then transmits its electrical voltage energy to the spark plug and you accomplish a spark. Now, that function of the spark-plug is performed whether the circuit breaker is located on the shroud — outside of the shroud or within the shroud and outside of the crankcase of the engine. That function as to the circuit breaker is also performed whether the cam is driven directly off of the crankshaft, or directly off of the camshaft, with one exception: That using the camshaft you are breaking your contact once every two revolutions instead of once every revolution of your crankshaft. Your breaker point does know—or the circuit breaker does know whether it is being opened every revolution of the crankshaft or every other revolution of the crankshaft, to this extent, over the period of the operation of your engine you are getting one half of the number of breaker point actuations; your breaker points do know as far as life and wear. That is also true

on every automobile engine that I have ever known.
86 Every automobile engine, the sparkplug fires only once on each cycle of the four cycle engine.

In the Magnematic system, there is a condenser. It functions as one—at the time that your breaker contacts are open, the electrical energy that is in the system—when you disturb any electrical spark by opening a contact or a switch you will get an arcing condition. In order to minimize the effect of this arcing condition on these points, in order to give you increased life and wear of the points you have to use a device that will absorb that electrical energy at a fast rate and discharge it at a slow rate to ground, and thereby take the brunt of the shock away from the contact at the breaker points. If you don't have such a device in short you will not have life in your contacts points, and in some magneto designs you cannot even effect the proper high tension spark.
87 The condenser is a very important part of the ignition system. Without it you would have a real engine starting problem.

The ignition problem is the same, to a degree, in a single cylinder, single piston engine of low horsepower as it is of a single cylinder engine of a higher horsepower, with the exception in the smaller engine, comparing a one horsepower engine to a five or six horsepower engine, you have a smaller and light weight parts which by virtue of their smallness they have less friction to overcome and possibly you can crank at a more effective speed the smaller engine than you can the larger unit. Physically — the physical requirements would be greater to crank the larger engine. To my knowledge this Magnematic ignition system is used on a nine cubic, a fourteen cubic inch and a twenty-three cubic inch displacement engine of the Briggs & Stratton Corporation.

Page of Transcript

88 The 23 cubic inch is approximately six horsepower at our speed of operation about 2400 to 2800 rpm. The 14 is somewhere within the range of three to four horsepower, depending upon the operative speed. And the nine would be down in the order of one and three-quarters to two horsepower, depending upon the speed of operation.

89 With respect to the starting of engines in sub-zero temperatures, it is also common practice to heat the crankcase oil.

The normal operating speed voltage of the Magnematic system is not commonly different from that voltage found in other magneto coils, but in this particular design at the lower cranking speeds you do have and you do enjoy a hotter spark or higher voltage than usually found in other magneto systems. I am referring to the magneto as shown here—Exhibit 25. And I do believe
90 that that design was not usually embodied in earlier magnetos to give you the hotter spark at low crank speed because you did not have the advantage of a spark retarding effect and as a result without the spark retarding you have greater severity of kickback if you did use a hotter spark. So I do feel an advantage or result from the use of an automatic spark retarding permitting the use of a hotter spark at low cranking speed to aid you in getting easier starting. That function of a centrifugal spark advance is in other ignition systems, but not having a hotter spark, not necessarily so. You find that is embodied in a design that had not been used too many years or had not been used many years ago. It had been used possibly in an integrated magneto and in connection with possibly an impulse type feature in magnetos. That is one of the reasons they have always used the centrifugal controlled spark advance.

In the patent searches of the literature, we found
91 literature showing the breaker mechanism that was operated off of the cam gear for the multi-cylinder engine application, yes. We didn't find anything for a magneto used for a single cylinder application. Not that I remember, I don't think we did.

If the breaker in the magnematic ignition system were actuated by the cams operating at crankshaft speed, then of course on one complete rotation of your camshaft you would cause the cam to cause the breaker points to open once each revolution of the crankshaft. I consider the camshaft actuated circuit breaker contributes to the design and overall improvement. Contributes to the life of the system.

92 I made an inquiry to see if any of the unsatisfactory equipment reports that were submitted, whether there were some pertaining to failures of the Magnematic ignition system used on the PE 75 power units that were in use in Korea, and as a comparison I wanted to see as against failures resulting in World War II equipment, whether there were such failures. And I was not able to find—my maintenance division did not have one report relating to ignition failure. That does not necessarily mean there were no ignition failures. It means this, that the problem was a minimum problem, it wasn't a major repetitive type of failure where the officer in charge would consider it necessary to file an unsatisfactory equipment report. If it was a usage condition he normally would not file an equipment report.

93 ***Redirect Examination***

An integrated magneto is a completely self-contained magneto assembly containing the electric generating

Page of Transcript

parts, either a rotatable magnetic rotor and stationary winding or windings, in which is induced electricity, a set of breaker points, and a condenser, all-self-contained, where a shaft extends from the magneto body housing to engage either a direct or accessory drive from the engine itself. So that the magneto is operating at a predetermined and prescribed time and speed in relation to the engine itself.

94 The advantages, of those advantages to which I testified, that were attributable to that molded coil were the advantage of being more impervious to moisture absorption and corrosion as compared to the previous type of coil. But other than the coil it promoted easier starting at low temperature and longer operating life. No other advantages were derived except that the coil itself would be less subject to wear and tear and ineffectiveness. In other words, none of these other advantages flowed out of the coil.

The one important feature of locating the points externally or in an accessible manner gives you a means of examining those points or breaker contacts more
95 readily, more frequently, than you otherwise would. You are able to clean them, dress them up more frequently than you otherwise would, and adjust for proper gap. And these features were attributed to a longer operating life of the points and the entire ignition system, and the fact you could maintain them more readily. In the tests that we made on starting, talking about the engine with the Briggs & Stratton magnematic ignition system, we knew that those test results were not the result of some new or different oil or gas or condenser, or some of these other factors, because we had multiple control tests, and by these control tests we mean that certain elements

were maintained as constants. In other words, the fuel used, the type of oil used, conditions under which the equipment was subject to low temperatures. All of these factors were constants and we were only trying to determine what advantages were made as a result of the difference in ignition systems. Our tests were conducted with this control idea always uppermost in our mind.
96 That would be the only way we could determine whether a device, in being a new feature, had any grounds for improvement. If we hadn't maintained controlled tests the tests you made would be meaningless.

I wouldn't say from its physical aspects being molded made any difference in the design of that coil. Its electrical characteristics were slightly different to give you a higher induced voltage at lower cranking speeds than otherwise obtained in the previously used coils. Previously used coils were not designed to give you that magnitude of voltage at low cranking speeds. I would say it would not have been possible to have used a coil designed for low coming-in speed, having the voltage characteristics of the molded coil. As I mentioned previously you would be inviting a hazard and danger because without the feature of a retarded spark and a higher
97 voltage at low cranking speed you would get a greater magnitude of kickback in an engine.

Although we knew that all of the individual features and advantages of the Briggs & Stratton Magnematic ignition system were present in multi-cylinder engines—we did you not adapt that knowledge to our ignition and starting problems on single cylinder engines, because although we were aware of these features individually it was not obvious to us to put them together and use

Page of Transcript

them in relation to a flywheel magneto in a single cylinder engine.

Using the magnematic ignition system on the Briggs & Stratton engine in our cold tests, to temperatures of minus 25 to 30 we did not take any means of heating the crankcase oil, and we had specific reasons for not — for trying to see what type of starting could be effected.
98 In order to heat the oil in the field you would have to provide a means of using a separate type of heater or some sort of fresh air heater driven by other electrical devices, which in themselves were not available. So it was a problem to see to what extent using the proper fuel and lubricants, to what range of low temperature we could subject a unit, and accomplish successful starting without regards to heating or other starting aids. And we were able to positively start the BP Briggs engine with the Magnematic system, and more readily at temperatures of minus 25 degrees F. than we were able to do in the previous ZZ Briggs & Stratton engine which did not have the Magnematic system.

Re-cross Examination

Q. Mr. Shore, in this exhibit 25—plaintiff's Exhibit 25 there is a voltage curve of the Magnematic magneto on page 3. Will you tell me whether or not that voltage curve is a new curve?

A. Now, in what sense?

Q. Were you familiar with that type of voltage curve on internal combustion engine ignition systems prior to the Magnematic?

A. Oh yes, yes sir.

Page of Transcript

99 Q. In other words, other ignition systems in the prior art, prior to the Magnematic, it was old to have that same type of voltage curve?

A. Yes sir.

Q. Well, that was at cranking speeds, and then after the voltage dropped down you would pick up the operating speed of the engine, that was old?

A. Not necessarily in all cases.

Q. Well, was there in any case?

A. There were in some cases.

Q. Just one or two, just as long as it was old.

A. Uh-huh.

Q. It was then?

A. Uh-huh.

100 So far as I know this magnematic system is not used on lawnmowers, that is, for the average lawnmower user. It is quite possible that it is not needed for that type of an application because they are not cutting grass in the winter time, and you are not subjecting the engine to the type of environmental rigors that would be employed in a military engine.

* * *

102 *Mr. Balluff:* As Your Honor has said, in the original hearing the question of infringement was not particularly argued.

The Court: I would say that was an understatement.

Page of Transcript

DEPOSITION OF HAROLD E. BRUNS

116 *Direct Examination*

Harold E. Bruns; 2311 Wisconsin Avenue, New Holstein, Wisconsin, age 51. I am Works Manager of the Lauson Engine Division of Tecumseh Products Company. I have been employed by the Lauson Engine Division under Tecumseh ownership, since January 3rd of 1956; and prior to that I was associated with the Lauson Engine plant here since April 15, 1935. At the time I came here in April, 1935, the plant here was in receivership, and I came here under the auspices of the Marshall-Ilsley Bank of Milwaukee as accountant. I prepared some financial statements prior to the public sale, which was then called a receiver's sale. This sale
117 was held on May 18, 1935, at which time the assets of the receivership were sold to the Marshall & Ilsley Bank, and the People's State Bank of New Holstein, Wisconsin. Then I stayed on here as treasurer of the new corporation, which was then formed after this sale and was known as the Lauson Company. That was a Wisconsin corporation. I remained as treasurer until about 1940 when I became secretary and treasurer. And in June, 1941, the Hart-Carter Company of Peoria, Illinois, purchased this facility and operated as a division. I remained as secretary and treasurer for them from June '41 until about January 1, '47, when I became President of this division. And it was then known as Hart-Carter Company, the Lauson Division. I was also an officer of the Hart-Carter Company, namely, assistant secretary—assistant treasurer. I remained as President until Tecumseh purchased this operation January 3, 1956. Actually my presidency expired at the close of business, December 31st, and Tecumseh officially took over January 3rd be-

Page of Transcript

cause of the holidays. At present I am Works Manager of this division.

119 During my years with Lauson, since I was either in the top position here, or close to the top most of the time, I was very closely associated with engineering. I read blueprints. Up until about four years ago A. S. Bosma was head of engineering at Lauson. Alfred S. Bosma. Glennroy Aggen was chief draftsman. The general nature of the products that Lauson has made down through the years has been gasoline engines.

120 Defendant's Exhibit No. 70 is Manual Instructions and Part List for the Lauson Sport King outboard motor. It was published 1946, in November. I know that we published manuals of this kind at that time, and also the printing date is on the form back here. It relates to the Lauson Sport King outboard motor which was manufactured in this plant between 1940, approximately, and 1947.

121 To the best of my recollection the number of Lauson Sport King engines that were made and sold between 1940 and 1947 would be in the neighborhood of from 20,000 upward. Exhibit 70 is not the first or only catalog that was ever published on this Sport King outboard motor. As I recall, there were quite a number of them. The Sport King outboard was designed by A. S. Bosma, as chief engineer, and Glennroy Aggen as his assistant. I was here at the time it was designed. It was a four-cycle, air cooled, single cylinder internal combustion engine. It had a bore of two and one-eighth, and a stroke of one and three-quarter, approximately two and one-half horse power. This catalog, Exhibit 70, gives you the

Page of Transcript

details of the engine. It properly describes, or sets forth, the specifications of the engine.

122 The cylinder and crank case of the Sport King were made in a single casting. They were made in the same casting, and in that construction, that type of construction, the major parts of the engine were all included in this major casting, let's say. The material from which the casting was made was grey iron. The OB-1 casting,
123 upper left-hand corner of page 6 of Defendant's Exhibit 70, comprised entirely the cylinder bore, the cooling fins with it, the valve cage, the crank case, the valve guides, the bearing openings for the crank shaft and the cam shaft, and the enclosure for basically all the working parts of that engine. All of the walls of the crank case were a part of this casting OB-1 except for one opening. There was an opening, as is shown here. A large opening which was closed by the oil sump. I would designate that wall that was open as the power take-off wall of the engine. This wall that I just alluded to, the wall which houses the power take-off end of the crank shaft, was closed by a little intermediate plate, or baffle, and an oil sump casting. That baffle is shown here on page 6 of Exhibit 70 as part OB-2064. The oil sump is not shown on page 6, but it is shown on page 8, and it is there des-
124 ignated as OB-1015. The crank shaft was mounted on the magneto end through this bearing aperture in the cylinder and on the other end through this intermediate baffle plate, OB-2064, and it extended on through the bearing boss in OB-1015.

Referring to this baffle plate OB-2064, there is an opening in about the one o'clock position. That is on page 6 of this catalog. This opening is the opening for the cam shaft which is mounted in this end and again

Page of Transcript

on the magneto end of the cylinder. And that opening on the cylinder OB-1 is about in the one o'clock position. Now, in this plate OB-2064, there are two openings, one above and one below the center at about the twelve o'clock and the six o'clock position. Those were oil return holes. This engine was designed to be used in an out-
125 board motor, and as such, and knowing that an outboard motor is transported in many different positions, and since it was a four-cycle engine in which it is necessary to add the oil in the oil sump, we had to provide some means of keeping this oil from the oil sump from getting up into the cylinder of the engine when the outboard was being transported in a horizontal position. So this baffle served that purpose. That problem with respect to baffling the oil is absent in a two-cycle engine since the oil is not retained in the crank case but is mixed with the fuel.

This Sport King engine that is shown in the catalog, Exhibit 70, was used for an outboard motor initially, and was also used as power for power mowers. Defendant's Exhibit No. 71 is a manual of instructions and repair parts list covering the Lauson Power Head. This printing was August, 1949, but we were building this engine in 1941, and there must have been printings at that time of this type also. I know of my own knowl-
126 ge that there were previous printings of this catalog such as identical with Exhibit 71.

The Lauson Power Head was the basic engine part of the Lauson Sport King outboard. It included this crank case and cylinder OB-1 shown on page 6 of defendant's Exhibit 70. It included all the parts listed on page 6; also on page 8, with the exception of a couple of items peculiar to outboards. I am referring now to

Page of Transcript

this catalog of the Sport King outboard motor, defendant's Exhibit 70. The parts shown on page 8 that were not included in the Power Head were the steering handle grip, the steering handle. That is OB-416 and 447. And the oil sump, OB-1015. Instead of using OB-1015 in the
127 Power Head, we used another casting which took its place, which can best be identified by referring to page 10 of the Power Head manual, and refer to Item 70. That was an oil sump base which was used on the Power Head to make the Power Head adaptable to the rotary-type lawn mower, and it incorporated in it a mounting means so that the engine with this base on it could be directly mounted on a rotary-type lawn mower. Plate 70 was actually the adapter plate also for securing the engine to the lawn mower. Plate 70 was for the purpose of providing a means of carrying the lubricating oil for the engine, and also for mounting on rotary-type power mowers. The Power Head engine was built and sold by Lauson between the period of 1941 and '47. There were
128 several thousand. On page 9 of the catalog, defendant's Exhibit 71, there is shown a Plate 55. That is the same plate that is shown on page 6, defendant's Exhibit 70, OB-2064. On page 7 of the Power Head manual, Defendant's Exhibit No. 71, there is shown a part, designated 1, and its service number is 23037, and described as a cylinder. In the catalog, defendant's Exhibit 70, on the Sport King, page 6, that would be the same as OB-1.

* * *

132 Exhibit No. D-78 is a Lauson Sport King outboard motor. That engine is made in accordance, or the same engine as shown in these drawings, Exhibits D-72 through D-77, inclusive, and the two catalogs, Exhibits D-70 and
133 D-71. This particular engine, Exhibit D-78, was built

in '47. This serial number is 7-ob-9179, I believe. The first number being "7" indicated a year at that time. The established practice at Lauson with respect to numbering these Sport King engines was that the engine was built and upon completion it was then serial numbered in our shipping department where they kept a record of running serial numbers. And that practice was always followed.

134 In converting the Sport King outboard motor of Exhibit D-70, to the Power Head which is shown in defendant's Exhibit D-71, the basic important change was the elimination of the outboard motor oil sump casting and the substitution of another casting. When we eliminated the outboard motor casting, which is part No. OB-1015, we eliminated the rest of these parts, such as the
135 propeller. Whatever extends below that plate OB-1015, plus the steering handle. Defendant's Exhibit D-79 is the oil sump casting. When applied to the Lauson outboard motor it made that engine adaptable to such applications as rotary power mowers. In this catalog, defendant's Exhibit No. D-71, that is Item No. 70, on page 10. In converting the Sport King engine, which is Exhibit D-78, to the Power Head, we removed everything from the outboard engine base, or so-called oil sump, down, and substituted this Power Head base, namely, Item 70 on page 10. Then we also removed the
136 steering "L[redacted]n other words, it was not applicable to this base. Now, referring to the second sheet of Exhibit D-70, we removed from the Sport King all of the parts shown below this plate OB-1015, and substituted for that plate this sump, Exhibit No. D-79, which is the part No. 70 on page 10 of Exhibit No. D-71. I personally observed that being done. Now, referring to Exhibit
137 D-70, page 6, the part No. OB-1 was a cast iron element.

Page of Transcript

And this shows the cylinder and crank case, but the crank case has an open wall. The parts used to close that open wall, referring to Exhibit D-70, were this intermediate baffle plate, identified as Part OB-2064, on page 6; and on page 8, OB-1015, known as the outboard motor oil sump casting. And, then, in addition to
138 the Part OB-2064, for closing this open wall of the crank case OB-1 we used Item 70, page 10 of Exhibit D-71. When we converted the Sport King engine, Exhibit D-78, to the Power Head shown in Exhibit D-71, in some cases we might have added a screen to the starter pulley. You can see the other part of the motor. To eliminate grass from getting into the engine, and we might on occasions have added a die trip air cleaner to the carburetor. The basic crank shaft forging in the Power Head was the same that we used in the Sport King, but it was machined different for the power take-off end. In the Power Head, which is shown in the catalog Exhibit No. D-71, there were no differences whatsoever in the cylinder and crank case which is OB-1, on page 6 of Exhibit D-70. The cylinder gear — combination cylinder and crank case casting remained the same for both types. By "same" I mean identical. And this plate OB-
139 2064, was the same identical plate in both the Power Head and the Sport King outboard. We substituted, though, a different oil sump, namely, Exhibit D-79, instead of this part OB-1015, page 8 of Exhibit D-70.

Gwynedd Corporation was one of the companies that used the Power Head which is shown in defendant's Exhibit D-71. They were at that time at Landsdale, Pennsylvania. That same company was also known as Rotomower.

• • •

Page of Transcript

142 Between 1941 and 1947 the Gwynmower and the Rotomower used the Power Head as a source of power for its rotary mowers.

143 STIPULATION: During the period from 1940 to 1947 the Lauson Company manufactured and sold several thousand Sport King outboard engines, such as shown in defendant's Exhibit No. D-70, and present here as defendant's Exhibit No. D-78, and several thousand Power Head engines for use on Lauson mowers such as shown in the manual of instructions, defendant's Exhibit No. D-71.

The piston in the Sport King engine was made of aluminum. Prior to 1950 we had experience with using aluminum as a bearing material. We used it on con-
144 necting rods in the form of aluminum connecting rods running directly on steel crank shafts. We found aluminum to be very successful as a bearing material.

146 *Cross Examination*

Between 1940 and 1947, Lauson was making other engines for, or adaptable for, lawn mowers. As an example two horespower iron and called Model RFE was being made. After 1947 Lauson made several en-
147 gines designed for use on or adaptable for use on rotary power lawn mowers. Lauson made an engine which followed the drawings of Patent No. 2630881, which is made of record in the prosecution of the Lechtenberg patent, in suit in this action. It was known as our Model RSV-750. It was made as early as 1949. In the way of rotary lawn mower engines,
148 between 1947 and 1950, we made the Model RSV-750, which I mentioned before, and we made a Model RSH-

Page of Transcript

775. We started making the RSH-775 about 1940, and
149 the RSV-750 about 1949. During 1947 to 1951 or '2 we also made conventional horizontal shaft engines which were used on lawn mowers. The manufacture of the Sport King outboard engine, one of which is in evidence here as Exhibit D-78, was discontinued in 1947. Lauson continued to make and sell outboard engines after 1947. We brought out two new models. Referring to the patent to A. S. Bosma, No. 2607332, which is of record in the file wrapper of the Lechtenberg patent here in suit, Lauson made an outboard engine like that shown in the Bosma patent during the period subsequent to 1947. We are still building the engine, Model R, embodying disclosures of Patent 2705056 and Patent No. 2705002, to Bruns and Bosma respectively. As I recall, it was '52 that we began making them.

150 Lauson has a number of patents. We maintain a constant program of patent activity.

Manufacture of this Sport King engine, of the type shown as Exhibit 9, was discontinued by Lauson because the trade was becoming interested in more streamlining. They wanted more horsepower. In other words, they wanted something new.

151 The purpose of the baffle plate, which is identified in the outboard engine manual, Exhibit 1, as OB-2064, when that baffle plate, or one like it, was used on the Power Head engine, it did not — it wasn't intended in that case to baffle the oil necessarily. It carried its other function of carrying the bearings for the crank shaft and cam shaft. In other words, it did have an important function of supporting the crank shaft and cam shaft on both of those engines. In assembling either the Power

Head engine or the Sport King outboard engine, it was necessary to fasten that baffle plate, corresponding to this OB-2064, — to fasten that on before the sump was
152 put in place. To make a complete engine. I should add there that the sump also helped hold the piece. It was not completely fastened without the sump. It was partially fastened, and then the sump completed the fastening. You could not have fastened it to the sump and then installed it, not in that setup.

There was no horizontal shaft counterpart of the Power Head engine. That particular cylinder crank case casting which is used on the Power Head and on the outboard Sport King was never used as a horizontal shaft engine without revisions. With only a change in the cover which forms this combined sump and flange mounting, it could not have been used as a horizontal shaft engine without other changes in it. The Power Head
153 engine was never die cast; that is, the cylinder crank case portion of it. It could have been made as a die casting in the form in which Lauson built it. Exactly that way.

Lauson now makes a die cast engine. Model SLV is one, Model VA. Lauson started production of this
154 light weight die cast engine, either the SLV or the VA, in early 1954, to the best of my recollection. That engine
155 was announced early in 1954. To the best of my recollection, approximately April, 1954. These VA and SLV engines are good sellers. There is a big demand for them. We are not quite able to meet the demand for them.

157 *Redirect Examination*

In making the Sport King engine, Defendant's Exhibit D-78, that would operate with the crank shaft horizontal,

Page of Transcript

you would not have to change the casting which part No. 23037 represents, No. 1 on page 7 of the Power Head pamphlet, Defendant's Exhibit D-71, and also referred to as OB-1 on page 6 of Defendant's Exhibit D-70. I
158 know for a fact that you could use the single casting of the cylinder and the crank case, OB-1, that is, that you could cast the cylinder and crank case as a single casting and use it in a horizontal engine in which the crank shaft operated in a horizontal plane. We make many thousands of horizontal shaft engines.

The cylinder and crank case in this part No. 1 of Exhibit 28 are one die casting, or they have incorporated within that casting a cast cylinder. There is one wall of the crank case that is open. That is the power
159 take-off side of the engine. I find a comparison between the part No. 1 of Plaintiff's Exhibit 26 on page 11, and OB-1 on page 6 of Defendant's Exhibit No. D-70. In fact, the light weight engine was designed from this original Sport King engine. I participated in the design of this light weight engine in my usual manner of suggestions and so forth. The part No. 1, reference No. 1 on page 12 and shown on page 11 of Plaintiff's Exhibit 27, the Model SLV, and the part reference No. 1 on page 11 of the Plaintiff's Exhibit 26 of the Model VA engine are basically similar. So what I said with respect to part No. 1 of the Model SLV engine, Plaintiff's Exhibit 27, holds equally with that part in the Model VA engine.

When the trade began to demand light weight, we
160 examined all of our line of engines to see what we had. This appeared to be the best for a pattern for a new light weight engine. By "this" I mean this Sport King outboard engine. Defendant's Exhibit D-78. And my

instruction to our engineers was to use that as a pattern for their design. And we did that, plus the fact that we used some of the same parts that were actually used in the Sport King outboard engine. Parts used from the Sport King engine in the Model VA, or the Model SLV engines were lifters. One item we know of. Part OB-65, on page 6 of Exhibit D-70; also part OB-361-1, on page 6, which is the oil pump barrel. The bore and stroke of the engine were identical. The location of the cam shaft and crank shaft were identical. And I believe the piston was identical. There has been a slight change in the width of the ring grooves, I think, since then,
161 but we started out with the same piston.

In the Power Head you had this plate that is shown here as Exhibit No. D-79. This casting D-79 was used as the oil sump casting when the outboard engine was applied to lawn mowers. It provided the oil sump as well as a mounting means on the mower deck. Referring to Plaintiff's Exhibit 26, which is Model VA engine catalog, there is a part on page 11, a cut of a part which is referenced No. 44 and referred to on page 13 as Mounting Flange Assembly consisting of mounting flange, oil well, oil screen and drain plug. That piece serves the same function as this Defendant's Exhibit No. 79 served when using the old Lauson outboard engine on a rotary mower. On this plate, Defendant's Exhibit No. D-79, this round circle that is bordered by five holes — I mean on the under side — is known as the mounting circle. I think it is approximately an 8-inch bolt circle. We
162 use an 8-inch bolt circle on the mounting circle, or base plate, because in the early 1940's, when rotary mowers first came out, there seemed to be a pattern being established for this type of a circle mounting. As was

Page of Transcript

earlier shown in the McCullough engines, the first two-cycle McCullough lawn mower engines had such a circle, and we adopted a circle similar because it appeared to be adaptable to rotary-type lawn mowers. And since, that circle has become standard in the industry. McCullough is a manufacturing company who manufactured chain saws and now they manufacture rotary mowers. And they manufactured at one time, probably still do, two-cycle engines for uses such as power mowers.

The demand for a light weight lawn mower engine originated probably with the coming up of the two-cycle engines. Two-cycle engines for rotary mowers were substantially lighter, let's say, in the middle '40's than any cast iron engine used for the same purpose. And the merchandising experts were trying to sell rotary mowers to people and they wanted a light weight unit; easy to move around. Two-cycle engines seemed to answer part of that problem. Four-cycles were too heavy.
163 That was the thing that caused us to get into lighter weight engines. These two-cycle engines were made generally of die cast aluminum castings, and most of them had sleeves in the cylinder bore cast in such as Power Products, Clinton, and others. Some of the others that were making two-cycle aluminum die cast engines for power mowers prior to, we will say, 1952, were Jacobsen, McCullough, and I believe Propulsion Engine Company of Kansas City, I think. Power Products at Grafton. West Bend Engine Company. Outboard Marine was making a power motor, or engine, for a power mower. They still do make a two-cycle engine for rotary-type power mowers. They purchased the RPM plant, and then started to make their own engines. We make some cast iron, vertical shaft, four-cycle, air-cooled engines for

Page of Transcript

164 rotary-type power mowers. We sell some. I believe Clinton makes some. All of the vertical shaft engines that Goodall uses on one of his models are still cast iron and made by us. We also make a three and one-half horsepower vertical cast iron shaft engine that is used by such people as DeVere, some others, King Manufacturing. We still make that. Wisconsin Motor Corporation Division of Continental Motors makes a vertical shaft, I believe, four-cycle, for Toro, I think in about a six horsepower, I believe.

We manufactured the engine of Bosma Patent 2638881 about 1949. That was the RSV-750. That is the engine we started to produce after we discontinued the Power Head. That was the next new version of vertical shaft engines. The original of that was the RSV engine. The RSV engine was normally a horizontal shaft engine.
165 And we converted that, or modified it into the engine shown in Bosma 2638881. The main reason we went to the engine shown in the 881 patent instead of continuing the Power Head was we were very well tooled on this Model RSV engine, which later became Model RSH. We had excellent tooling. It was a production item with us. We had a good demand for it in the horizontal version, whereas on the other engine, the old outboard engine, Exhibit D-78, our tools were of the most modest type.

STIPULATION

Mr. Jones: If A. S. Bosma were called as a witness he would testify that he designed the Sport King and the Power Head motors, and that the drawings, Exhibits D-72 to D-77, inclusive, are drawings of such motors.

Page of Transcript

Mr. Raisch: And that the Sport King engine and Power Head engine were designed and built as shown in the drawings, Exhibits D-72 to D-77, and in the manuals, Exhibits D-70 and D-71, and as exemplified by Exhibit D-78, and that the Power Head and Sport King
166 engines were made and sold in quantity during the period of 1940 to 1947.

Mr. Jones: I am generally in accord with that. In the quantity made and sold as testified to by Mr. Bruns. It is so stipulated.

---

167 CLARENCE P. DAMON

Direct Examination

Clarence P. Damon, thirty-seven years old, and I reside at Tecumseh, Michigan. Employed by the Clinton Machine Company. I am the Assistant to the Director of Engineering.

I am familiar with the Sport King, Exhibit D-78. I was instrumental in obtaining that for the defense.

169 In transforming the Sport King Outboard to a Power Head unit the crankcase, the steering bracket, the steering bracket adjustment swivel, the drive shaft, the steering handle, the oil filler plug, gear housing, propeller, propeller nut, baffle plate, exhaust outlet, and exhaust tube are removed, which constitute the lower unit and column assembly. You don't remove the steer-
170 ing bracket and clamp screw from the bracket. That comes off with the steering bracket, it comes off as one unit. In Defendant's Exhibit D-71, on Page 10, the oil base, identified by the figure 70, is substituted in place of the parts removed. That is Defendant's Exhibit D-79.

Page of Transcript

172 This crankcase and cylinder, the red part, is a piece of cast iron, sand cast. That part is not changed in transforming the Sport King into the Power Head.

On the end of the crankcase here, opposite the cylinder, there is a small plate, diamond shaped, about seven-eights of an inch in diameter and fastened on by two
173 bolts. By examining it, I would say that it was to facilitate production, for attaching the screws, tightening the screws, and the connecting rod. The screws that hold the connecting rod cap to the connecting rod forming a bearing for the crankcase. If that little hole that is covered by this plate that I just alluded to were omitted, you would be able to fasten the connecting rod to the crankcase. I did it to see if it could be done.

STIPULATION: For the purpose of mounting the Clinton VS-700 engines on the decks of its rotary power mowers Hummer Manufacturing Co. manufactured its own mounting bracket or adapter plate which was bolted onto the mounting pad which is the bottom face of the crankcase wall of the VS-700 engine, and this adapter plate in turn was bolted onto the deck of the mower.

Hummer Manufacturing Co. manufactured and used the mounting bracket Part No. L14-238, shown in Exhibit D-84-A attached hereto, to mount the
176 VS-700 engines on the decks of mowers made by Hummer from 1949 to the fall of 1951. A mounting bracket like that shown in Exhibit D-84-A is offered herewith.

Rotary power mowers shown in Exhibits D-84-B and D-84-C, employing the Clinton VS-700 engine and the Hummer L14-238 mounting bracket shown

Page of Transcript

in Exhibit D-84-A, were sold in the United States by Hummer in the latter part of 1950, and during
177 1951 production quantities of such mowers were sold through Montgomery Ward stores.

In the fall of 1951 the mounting bracket which Hummer made for mounting the VS-700 engine on its mowers was changed from the type shown in Exhibit D-84-A to that shown in attached Exhibit D-84-D. The mounting bracket shown in Exhibit D-84-D was also given Part No. L14-238 and was interchangeable with the mounting bracket shown in Exhibit D-84-A, the principal difference being that the mounting bracket assembly shown in Exhibit D-84-D employed rubber pads to reduce vibration and stresses on the engine. A photograph of the Exhibit D-84-D mounting bracket is attached hereto and identified as Exhibit D-84-E. The mounting bracket shown in Exhibit D84-E is offered herewith.

The lawn mowers manufactured by Hummer Manufacturing Co. employing Clinton VS-700 engines mounted on the decks of the mowers by the above said mounting brackets made by Hummer Manufacturing Co. were made in production quantities from February 1951 on, and such mowers were shipped by Hummer Manufacturing Co. to the va-
178 rious branch stores of Montgomery Ward and were sold by Montgomery Ward through such branch stores throughout the United States.

All of the VS-700 engines used on mowers manufactured by Hummer Manufacturing Co. were purchased without the mounting flange Part No. 4400 normally supplied by Clinton, and all such engines

Page of Transcript

were mounted on the decks of the mowers by one of the bracket assemblies made by Hummer Manufacturing Co. and shown in Exhibit D-84-A or D-84-D. The only vertical shaft engines which Hummer Manufacturing Co. used on its rotary power mowers during the years 1950 through 1954 were Clinton VS-700 engines.

* * * *

181 After the Clinton lightweight engine became available, Hummer Manufacturing Company no longer purchased the VS-700 engine, except in negligible quantities.

On certain of the mowers manufactured by Hummer Manufacturing Company there is a drive from the engine by which the lawn mower is propelled and, on such mowers, the standard Clinton lightweight engine is mounted on an adapter plate manufactured by Hummer and which permits bodily shifting of the engine to provide for adjustment of the tension of a power transmission belt through which the engine torque is transmitted to the driving wheels which propel the mower.

On those of its mowers which do not provide for power propulsion of the wheels and which employ the Clinton lightweight engine, the engine is mounted directly on the deck of the mower with no adapter plate being used.

183 *The Witness:* With respect to Exhibit D-85, the adapter plate, which was attached to the engine, is normally sold as a part of the assembly.

* * * *

Page of Transcript

191 With reference to the VS block, Plaintiff's Exhibit 19, no change was required in the block or in the complete VS-700 engine to permit the use of any of the three different adapter plates, the Clinton adapter plate, Exhibit D-87, the Hummer plate, D-88, and the Hummer plate, D-89.

• • • •

195 STIPULATION: Hainke Mower Company, having a place of business at 527 North Fontron, Hutchinson, Kansas, or its predecessor in business, began in 1949 to manufacture rotary blade power lawn mowers employing Clinton VS-700 engines as the power source for such mowers.

In 1949 and following years Hainke Mower Company purchased VS-700 engines from Clinton Machine Co., Inc. for use on rotary power mowers. The VS-700 engines were purchased from Clinton without the Clinton mounting flange or adapter plate, Part No. 4400, which Clinton manufactured and normally supplied for use with the VS-700 engines.

In 1950 and 1951 Hainke Mower Company manufactured and sold in the United States a rotary blade lawn mower known as the "Whirl Cut" mower which employed a Clinton VS-700 engine as the power source thereof. The VS-700 engine was mounted directly on the deck of the Whirl Cut mower by bolts extending through bolt holes in the deck and threaded into the tapped holes in the mounting pad, which is the bottom face of the crankcase casting of the VS-700 engine. A deck employed in the Whirl Cut mower and onto which the VS-700 engine was thus mounted without the use of an adapter plate or mounting flange is shown in the

Page of Transcript

attached photograph identified as Exhibit D-90-A hereof.

196 During 1950 Hainke Mower Company manufactured and sold in the United States a Model D-19 rotary lawn mower which employed a Clinton VS-700 engine as the power source. The VS-700 engines used on the D-19 mowers were purchased without the Clinton adapter plate, and were mounted on the decks of the D-19 mowers by means of an adapter plate manufactured by Hainke Mower Company. The adapter plates manufactured by Hainke Mower Company and used on the D-19 mowers for mounting the VS-700 engines on the decks of such mowers were bolted onto the mounting pad formed on the bottom wall of the crankcase of the VS-700 engines and were in turn bolted onto the decks of the D-19 mowers. A photograph of an adapter plate manufactured by Hainke Mower Company and used for mounting the VS-700 engine on the deck of a D-19 mower is shown in the attached photograph identified as Exhibit D-90-B.

In 1951 and subsequent years, Hainke Mower Company manufactured and sold in the United States Model No. E53SP rotary power lawn mowers which employed Clinton VS-700 engines as the power source. The Clinton VS-700 engines used on the E53SP mowers were purchased by Hainke Mower Company without the Clinton mounting flange Part No. 4400. Hainke Mower Company mounted VS-700 engines on the decks of the E53SP mowers by means of adapter plates manufactured by Hainke Mower Company, one of which adapter

Page of Transcript

197 plates is shown in the attached photograph identified as Exhibit D-90-C hereof. Such adapter plates were bolted onto the mounting pad of the VS-700 engines and were in turn bolted onto the decks of the E53SP mowers. The Exhibit D-90-C adapter plates carried an additional bearing for the power take-off end of the crankshaft. Such adapter plates also incorporated power take-off means for taking power from the crankshaft to provide motive power for driving the wheels of the E53SP mowers. Hainke patent No. 2,688,224, copy of which is attached hereto as Exhibit D-90-D, shows an adapter plate like that shown in Exhibit D-90-C and shows the manner in which such adapter plates were used to mount Clinton VS-700 engines on the E53SP mowers.

* * *

198 When Clinton Machine Company brought out its lightweight engine in 1954, Hainke Mower Company was sent a small number of them for testing. At first, Hainke Mower Company decided against using the lightweight engine, preferring to continue with the cast iron VS-700 engine because Hainke felt that such an engine had better quality, and it was interested in producing a quality product. However, later in 1954, the market demand for a lower priced mower impelled Hainke to go to the lightweight Clinton engine, and it is now using the VS-100 and VS-2100 Clinton lightweight engines, as well as Briggs & Stratton lightweight engines to the extent that they are available to it; and when its requirements for lightweight engines cannot be satisfied by four-cycle engines, Hainke uses two-cycle engines made by Power Products Co. Hainke also continues to use the Clinton VS-700 engine.

At the present time Hainke Mower Company uses no mounting adapter between the engine and the lawn mower deck on any of its mowers, whether power propelled or push models, and whether powered by a cast iron or a lightweight engine. In each case where it uses Clinton engines, Hainke Mower Company now does so with the mounting flange supplied on the engine by Clinton Machine Company, and this has been its practice since at least the time the lightweight engine was introduced.

* * * *

201 *The Witness:* No change was required in the block of the 700 vertical shaft engine of Clinton to adapt it or use it with the adapter plates Defendant's Exhibits D-91 and D-
202 92. With reference to Exhibits D-91 and D-92, in so far as the cylinder casting for the VS-700 engine is concerned, those adapter plates Defendant's Exhibits D-91 and D-92 are interchangeable with the adapter plates Defendant's Exhibits D-87, D-88, and D-89. They all have the same mounting holes and the hole provided for the crankshaft to pass through. All of these adapter plates are made to fit the mounting pad on the vertical shaft of the 700 engine.

203 STIPULATION: The VS-700 engines which Propulsion Engine Corporation used on the Westline mowers were purchased from Clinton Machine Co., Inc.
204 without the Clinton adapter plate Part No. 4400 manufactured by Clinton and normally supplied for use with the VS-700 engines.

The Clinton VS-700 engines were mounted on the decks of the Westline 2X-1225 mowers by means of adapter plates manufactured by Propulsion Engine

Page of Transcript

Corporation. Exhibit D-93-B is Drawing No. W-9010 showing the cast iron adapter plate manufactured by Propulsion Engine Corporation in 1950 and 1951 for mounting the Clinton VS-700 engines on the decks of the Westline mowers. The W-9010 adapter or mounting plate (underscored in red, page 19, Exhibit D-93-A) was bolted onto the mounting pad formed on the bottom crankcase wall of the VS-700 engine and was also bolted onto the deck of the Westline mower. Exhibit D-93-C is Drawing No. W-9010A, dated January 3, 1950, which shows an assembly consisting of the W-9010 adapter plate having a needle bearing and an oil seal assembled
205 thereto, the crankshaft of the Clinton VS-700 engine journaled therein, and a mower blade attached to the crankshaft.

Exhibit D-93-D is Drawing No. VE-955 showing an assembly consisting of the W-9010 adapter plate and the needle bearing and oil seal employed therein. The assembly shown in Exhibit D-93-D forms a part of the assembly shown in Exhibit D-93-C. The Exhibit D-93-D adapter plate assembly was used in 1950 and 1951 to mount the VS-700 engines on the decks of the Westline mowers.

Exhibit D-93-E is Drawing No. 1890378 which is an assembly drawing of Model 2X-1225 mower manufactured and sold by Propulsion Engine Corporation for the 1952 season beginning prior to May 1952 and showing the Clinton VS-700 engine mounted on the deck of the mower by the VE-955 adapter plate assembly shown in Exhibit D-93-D. The mounting pad on the VS-700 engine is captioned "Mounting Pad" in red on Exhibit D-93-E.

* * * *

Propulsion Engine Corporation of 311 Marion Avenue, South Milwaukee, Wisconsin, continued to use Clinton VS-700 engines on its lawn mowers through 1953 and part of 1954. However, when the Clinton lightweight engine became available, Propulsion Engine Corporation went to that engine, and at the present time uses no cast iron engines. It presently uses as many Briggs & Stratton lightweight engines as it can get, and also uses lightweight Clinton engines.

Propulsion Engine Corporation has been a manufacturer of two cycle engines, but to conform to the demand in the trade it is concentrating on production of lawn mowers powered by lightweight four cycle engines, discontinuing the manufacture of two cycle engines, and making only a few mowers powered by two cycle engines made by another manufacturer to be sold as low priced "leaders".

On push mowers, Propulsion Engine Corporation mounts the lightweight engines, as they come from the factory, directly on the lawn mower deck, without any intermediate adapter plate. In the case of self-propelled mowers, the lightweight engine is mounted on top of a gear box which is in turn mounted on the mower deck. The engine crankshaft extends down through the gear box, which provides for the power take-off for the propulsion drive, and the lawn mower blade is fastened on the bottom of the engine crankshaft.

Page of Transcript

The Witness: The adapter plate in Defendant's Exhibit D-93-A, Page 19, is specified as Part No. 211 and is fastened to the lower section of the crankcase on the mounting pad which is an integral part of Plaintiff's Exhibit 19 and would be attached through the same four mounting screw holes as formerly used on the other adapter plates.

209 There are four holes on Defendant's Exhibit D-94 which will register with the four tapped holes on Plaintiff's Exhibit 19, and attachment is made in this way with cap screws being inserted through a plate and on into the mounting pad of the crankcase and cylinder block. There are additional holes in the adapter plate for mounting it to the lawn mower deck. Exhibit D-94 attaches to the same engine as the adapter plate I have previously testified to, Exhibit D-88 and Exhibit D-89 which are adapter plates used by Hummer, and Exhibit D-87 which is the Clinton adapter plate, and would require no changes
210 in the engine proper to make such application. No changes are required in the crankcase and cylinder block.

* * * *

213 The mounting means on the McCullough engine, Exhibit D-7, are substantially the same as the mounting means used on the adapter plate for our VS-700 engine, Exhibit D-87, only here they are cast as an integral part of the cylinder block. I think the eight inch bolt circle was standardized from the McCullough engine, now used on our 700 as well as our lightweight.

214

CARL WOLCOTT

Direct Examination

Carl Wolcott. Jackson, Michigan. I am in the job die casting business. The name of my company is Die Cast Corporation, in Jackson, Michigan. I have been with that company approximately ten years. I am a part owner. I was one of the founders of it, and, at the present time, I design the dies and partly attend to sales and
215 the general operation of the plant. I am Vice-President. I am in charge of running the plant.

It is a job die casting operation. In the job die casting business we take blueprints from the customer and redesign in a sense of changing dimensions into die casting for building the dies and presenting samples to the customer. We maintain about ten die makers, but we also have some work done outside. We make die casting equipment at that plant. In connection with our work, we consult with our customers pertaining to the designing of parts for die casting. Our customers often bring a part into us that is already made and tell us that they
216 want us to die cast that part. In such cases, it is our practice to design and build dies for such parts. We also design and build dies for die casting from customer's blueprints.

Q. In the case of parts that are brought to you for die casting where such part might be, say, sand casted, is it your general practice to, in making such a part as a die cast, to make it exactly as it was made as sand cast, or is it your practice to recommend design changes

Page of Transcript

in the part so as to make the same more suitable for die casting operations?

A. Yes, after looking over the blueprint or the part if it is more desirable to change the contours, or draft, or dimensions, wall thickness, parting line, and so forth, we do so.

217 My company has about 150 men in its employ at the present time. About ten of these are die makers. We have 12 die casting machines at the present time. We
218 make die cast parts for all classes of trade.

We are at the present time producing die cast engine parts for Power Products. We die cast the complete engine. It is made in several parts. Also for Lauson, Clinton. We make cylinder crankcase blocks for Clinton. We made parts for Clinton as far back as 1947 and 1948.
219 With reference to the cylinder and crankcase block for the one cylinder lightweight engine of Clinton, I believe we began producing that block for Clinton in 1953. Prior to that we produced a two-cycle engine block which was one piece. I believe it was for the Clinton VS-200 two cycle engine.

Some of the most important advantages of using die castings, of course, are the reduction in cost. The die casting actually eliminates the drilling of holes and considerable machining and many times where parts were fabricated they can be cast as one unit. When a customer
220 comes in with several parts possibly that might be sand casted, or a blueprint, it might be advisable to advise the customer that those can be cast as one and eliminate fabrication of those different parts. It is common practice in die casting to die cast as one part a number of parts which previously might have been made separately.

Page of Transcript

Die casting in itself, that is the art of die casting, produces much stronger castings with the same wall thickness so that, therefore, if the customer asks for certain stresses the weight can be cut considerably by die casting. There is more uniformity in the parts that are die cast as compared with those that are sand cast. These ad-
221 vantages or characteristics of die casting were recognized when I went in the business and before that.

Q. Will you tell us what some of the principal qualities are which determine whether one would use die casting techniques to make a part?

A. Well, of course, one of the main objects is mass production. It is much easier to get the cost of the dies down, when you mass produce anything, than it is when you make only a few. That is one of the major considerations. Of course, there are many parts that are not mass produced which are die cast because actually there is no other way to make it.

Q. With respect to die casting, is there any advantage that the die casting process offers in the contour of the form of the part that is made as compared with other processes?

A. Yes, the surface texture of a die cast, nothing must be done to it particularly before painting, and it gives a very clean looking job, whereas a sand cast, or permanent mold does not lend itself to a good finish when it comes out of the mold. With a die cast part you get a relatively smooth surface.

223 This die cast, Defendant's Exhibit D-95, has undercuts in the casting. The main under-cut is where this core meets this core in here, and it is obvious by the parting line that this core is oscillated back and forth,

Page of Transcript

as the die opens, to clear the core, from this other one which kisses it in here. When I am talking about a core, I am talking about part of the steel die. Kissing cores were used in the production of that casting. The term, "kissing
224 cores", is merely one core meeting another one, either on its whole diameter or on the side, which forms a passageway in a casting. In the case of the casting, where kissing cores were used, in the production of it, they left an under-cut in that case.

225 Refer to Page 166 of "Die Casting" by H. H. Doehler (1951), and beginning on the second paragraph, the first sentence thereof reads: "If it is within the limits of size and weight imposed by commercial machines, almost any part can be die-cast." That is true. The next sentence says: "But if the commercial and mechanical advantages of the processes are to be fully realized, each part must be specifically and carefully designed for die casting." I would say that that was true. The next statement: "To take a design originally intended for a sand casting, plaster-mold casting, or some other method of manufacture and apply it without appropriate changes
226 to die casting is apt to result in unreasonably high cost, unnecessary complicated manufacturing problems, and impaired strength." That is true. In the third paragraph, the second sentence reads: "The designer should always consider the advisability of combining several or all of the components into one unit." I would say that that was true. That is to say, it is common practice to combine in one unit a number of parts which theretofore might have been produced separately. Page 167 shows three different illustrations designated as "A", "B", and "C". They show three different views of the same section, and one of them, designated by the letter "A", is

Page of Transcript

undesirable or it has the under-cut in yet. An under-cut in a die cast presents the problem of putting in a loose core which slows down the production and adds
227 to the cost of the die itself so that any under-cut, if it can be eliminated, it is done so during the designing stage. In this particular part, Defendant's Exhibit D-95, the problem is to pull this core, in the parting line area—this is the parting line here (Indicating) and that being the parting line of the die the problem is to pull this core in the same direction as the die opens, and, in doing so, you find that an under-cut is in here which prevents the core from being pulled in the straight motion of the opening and closing of the die so that this core must be pulled either prior to the opening of the die or prior to the ejection of the casting, and, in this case, the core is not straight here, but it is straight clear back in here and it oscillates in an arc. As the die opens and closes it can be actuated by mechanical means, and this particular piece is made in two pieces — I am talking about the piece of steel on the core that oscillates around in an arc and can be forming the under-cut in here—and this other core comes in at an angle and this, being the under-cut here, it oscillates around as the die opens up, or prior to the die opening. It is perfectly feasible in
228 die casting practices to make under-cuts in parts. But the principal objection to that is the addition in cost of the die, and it slows down production considerably.

Q. You described an oscillating core, the use of an oscillating core in connection with the formation of an under-cut. Are there other die casting techniques which are available, and which were available in 1951 for performing under-cuts in die cast parts?

A. Well, the use of the loose core which means that the core is loose in the sense that one core is pulled

DEFENDANT'S EXHIBIT D-96

DIE CASTING

BY

H. H. DOEHLER

Chairman of the Board, Doehler-Jarvis Corporation

FIRST EDITION

McGRAW-HILL BOOK COMPANY, INC.

NEW YORK TORONTO LONDON

1951

CHAPTER 4

DESIGN OF DIE CASTINGS

Two paramount considerations govern the design of die-cast parts, namely *part quality* and *economy of production*.

If it is within the limits of size and weight imposed by commercial machines, almost any part can be die-cast. But if the commercial and mechanical advantages of the process are to be fully realized, each part must be specifically and carefully designed for die casting. To take a design originally intended for a sand casting, plaster-mold casting, or some other method of manufacture and apply it without appropriate changes to die casting is apt to result in unreasonably high cost, unnecessary complicated manufacturing problems, and impaired strength.

It is important to remember that the part will be cast in two halves of a die, that the die and cores will be made of solid metal, and that the part must be drawn out after the molten metal has solidified. Unlike sand castings, which are shaped by sand molds and cores that are destroyed after one part is made, die castings are formed by molds that must be used for large-quantity production. Thus, if the part is anchored by a projection or depression at an angle to the direction of removal, special and costly die construction must be resorted to, as will be discussed later in the chapter.

Parts of an assembly or assembled sections must be designed so that they occasionally can be separated. The designer should always consider the advisability of combining several or all of the components into one unit. Of course, there is a limit prescribed by the size and complexity of the combination. Sometimes the whole assembly can be taken care of with more than one die casting and still show marked savings in assembly and fitting cost. The possibility of casting in separately machined or otherwise fabricated parts, which are cheaper to produce by themselves than as part of the die casting and/or which locally impart specific properties not inherent in a die casting, is a powerful aid in making simplification of construction and over-all reduction of cost possible.

Even when all components of a rigid and permanent assembly cannot be combined, assembly of several die castings into the whole is made easier and less costly than is possible with most other methods of fabrication by providing integral fastening devices in the die casting, which

in assembly are riveted, staked, or spun over. This obviously is only feasible with highly ductile materials such as zinc and some of the aluminum and brass alloys.

SELECTION OF PARTING LINE AND GENERAL DESIGN

The first step of the designer in modifying or projecting a design for die casting is to select the parting line; the line on the part at which

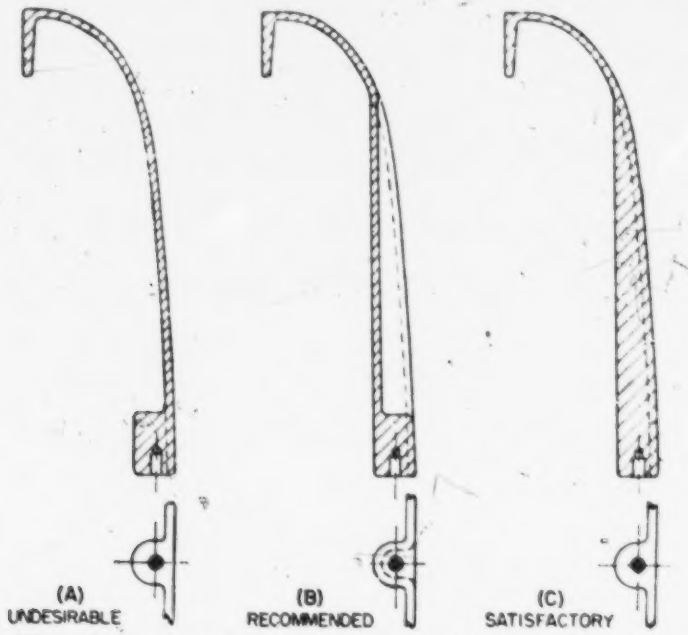


FIG. 41. Three designs for a die-cast part. That at *A* is undesirable because it is undercut and requires movable or loose die members to cast. That at *C* has no undercuts but requires more metal to cast. Neither of these disadvantages apply to the design shown at *B*.

the two halves of the die meet. Admittedly this usually is in the province of the die designer, but a knowledge of the end use of the casting is often essential when determining where the parting line should fall. The development engineer should always strive to modify the part design in order to provide for more speed and economy of production, with due consideration for the cost of trimming and finishing.

A flat or straight contour at the parting line is always preferable since the casting die is cheaper to construct, trimming dies are less expensive to build, and both types of dies are easier to maintain. This does not

mean that curved or irregular parting lines are not practical, but usually the matter is one of economies rather than of practicality of operation.

Actually, two primary factors govern the selection of the parting line:

1. Removal of the part on completion of the casting cycle.
2. The cost of constructing and maintaining casting and trimming dies and other cleaning equipment.

To these might be added other considerations such as efficiency of gating and venting; placement of ejector pins; and size, position, and type

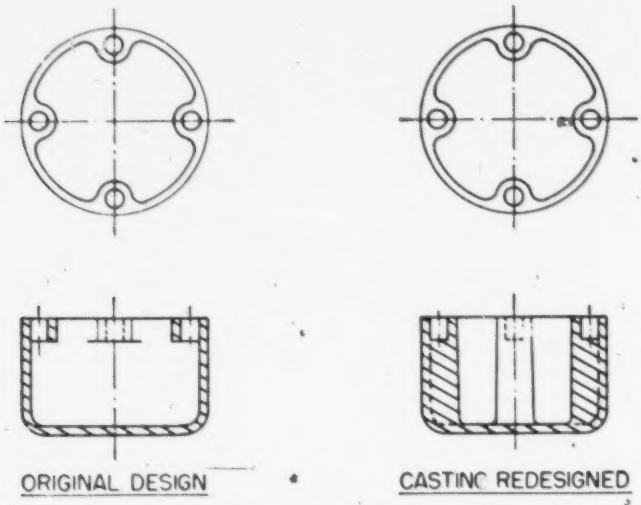


FIG. 12. Another example of how a casting was redesigned to simplify ejection on completion of the casting cycle. No undercuts are present in the redesigned part.

of cores required. Many of these are covered in detail in Chap. 2, Die-casting Dies.

As has previously been pointed out, the casting will be made in a rigid, inflexible die; therefore, the parting line must be selected so that the casting can be withdrawn after the shot is made. In general, the plane through the casting having the largest cross-sectional area should correspond to the parting plane. Failure to design the part with this in mind results in an undercut and usually necessitates costly die construction.

For example, the part shown at *A*, Fig. 4.1, is representative of a poor design. To cast it successfully would require either loose die pieces or an even more expensive collapsible core and operating mechanism. The design at *C* is better and can easily be produced, but it requires more metal to cast. The best design is that at *B*: it involves no undercuts, has a uniform wall thickness, does not have a large sectional bulk and can

RATE OF PRODUCTION

Speed of production of die castings is one of the major advantages of this process. The number of shots possible with a modern die-casting machine depends upon the material. It is high with low-melting-point alloys and progressively lower with higher melting point alloys. It also varies with the size of the casting, its complexity; the number, shape, and location of the cores and inserts; and special requirements.

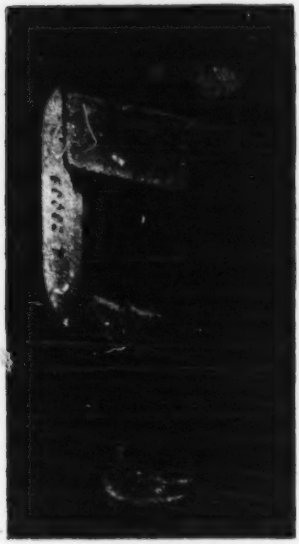


FIG. 5.2. Magnesium bolster for a ball-bearing spindle weighs 0.384 lb, measures 6 in. in height, and is cast on a 45-sec cycle.

Several hundred shots per hour is not unusual when die-casting small, relatively simple shapes from low-melting-point alloys. Even with larger, more complex shapes the casting cycle is short; the magnesium part shown in Fig. 5.2, which weighs approximately 0.384 lb and measures roughly 6 in. over-all, is cast on a 45-sec cycle. Definitely, then, die casting is a high-production process and therefore is generally not economical for parts made in limited quantities.

As a general proposition, the rate of production of die castings is higher than for corresponding parts made by any of the other casting processes: plastic molding, drop forging (except of very simple shapes), die pressing, and stamping and drawing (again except of simple shapes). It is, however, apt to be somewhat lower than for parts made on automatic screw machines and on automatic powder-metal presses. Molded thermoplastic materials of simple shape are nearest in speed of production to die casting; thermosetting resins must be cured before being removed from the press and so require a considerably longer time to produce. Sand casting, plaster-mold casting, and precision-investment casting generally are not considered to be high-production processes.

PART DESIGN AND COMPLEXITY

Another outstanding advantage of the die-casting process is that complex shapes can be made that would be difficult, if not impossible, to obtain by any other method—at least in large quantities. By the use of

sliding die members, undercuts and intricate holes can be formed in the part. Examples illustrating the degree of complexity that can be obtained are shown in Fig. 5.3.

For permanent-mold casting, gravitational forces are relied upon to pull the molten metal into the mold cavities. Only if centrifugal molds are used do the applied forces approach those common in die casting.

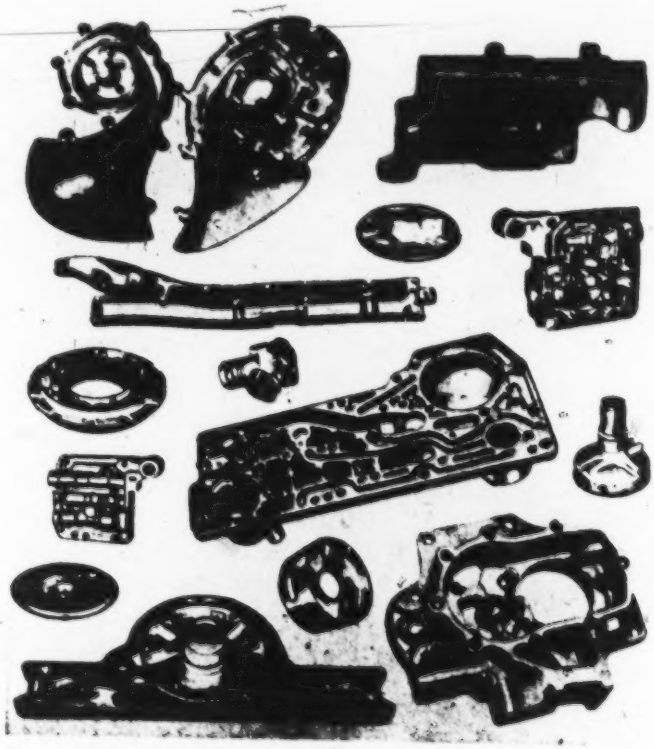


Fig. 5.3. These functional automotive parts illustrate some of the complex shapes that can be die-cast.

and as a result the metal cannot be forced in and around intricate passages and cores. Thus, the complexity of the parts that can be obtained is generally less than that obtained by die casting. The same thing is true of sand casting and permanent-mold casting.

Precision-investment castings can be made exceedingly complex, but the process usually is suitable only for small parts—7 in. or less in one dimension. The powder-metallurgy process to date has been limited to the production of relatively small and simple shapes with coring in one direction and with no undercuts, although this conceivably may change

leaving the loose cores in the casting itself. That is removed after the casting is ejected from the die.

229 On Page 210 of Doehler's "Die Casting," the first sentence of the first paragraph says: "Speed of production of die castings is one of the major advantages of this process." That is my experience. The speeding up of production, of course, could be adversely affected
230 by the complexity of the part to be die cast.

• • • •

234 The exhibit marked D-78-A could have been die-cast back at least when I first started in the business, without too many problems. It would have been about the same in 1951. I mean, we had the necessary equipment to produce such a casting, and it could have been produced. As the block is shown there are undercuts in this particular plane around here which would necessitate the using of loose cores. The undercuts can be eliminated just by putting the flange on the outside and having the undercut removed by carrying the flange out on the outer edge and continuing the flange on down to the lower part of the casting. The undercut I am referring to is nothing but an inward extended flange which surrounds the large opening in the crankcase wall of the casting. Having that flange extend into the opening, you would remove the flange so it would stick out of the opening.

Q. Now, this block has an opening closed by a small diamond-shaped plate, that opening being opposite the connecting rod in the wall of the crankcase, which is opposite the cylinder, would it have been any problem to eliminate such opening in that wall in making that part a die-casting instead of sand-casting?

A. No, it would not present any problem to eliminate the hole.

Page of Transcript

236 In 1951, based upon my experience, it would have been possible to die-cast the engine parts shown in figures 17 and 18 of the Conover patent, and the parts to which I have particular reference are the main block which forms the cylinder and the crankcase and wall 215, which forms part of the gas tank, and also the parts that are integrally connected to those parts I have mentioned.

* * * *

237 Q. Will you explain what you mean in the die-casting art by the term die inserts?

A. Well, die inserts cover a considerable area in the terms of the die-cast trade. A die-insert could be and usually is described by an operation of the complete die, which go to make up the same part or a number of possibly other similar parts. The die insert is part of the die. The main purpose of using it would be to cut the cost of the die, originally. You could make many parts from the same die possibly by interchanging the inserts. You could make many changes from the designs of the original one. In other words, you could take a basic design and introduce variations into the part by the use of die inserts. That was common practice in 1951 and earlier.

238 Q. Will you describe briefly how that cylinder liner is incorporated into the casting, [Defendant's Exhibit D-10]?

A. Well, the cylinder liner is a cast-iron sleeve which when the die is opened the sleeve is inserted on a core. As the die closes the core and the sleeve go forward and are positioned, and when the shot is made the aluminum flows around the sleeve making it a sound part of the casting.

DEFENDANT'S EXHIBIT D-98

DESIGNING FOR

ALCOA DIE CASTINGS

ALUMINUM COMPANY OF AMERICA

PITTSBURGH, PA.

1949

SECTION 1

WHERE TO USE DIE CASTINGS

The main reason for using aluminum and magnesium die castings is that they cut costs.

The decision to employ die castings in any application should be made on the basis of cost and product comparisons with other possible methods. Maximum production economy and superior product design can be achieved only by using the most suitable material and fabrication process for each casting produced.

A die casting may suit the application best if the answer to *any one* of these questions is "yes":

1. Is the quantity of parts involved considerable?
2. Is the tooling for machining expensive?
3. Do machining, assembling or surface finishing account for an appreciable part of the cost of the finished article?
4. Is a reduction of the investment in machine tools and plant floor space desirable?

Die casting is characteristically a high-speed, high-production process. For this reason, it is naturally suited to economical production on a quantity basis.

Die castings usually require very few secondary operations. Reduction of tooling cost means an important saving in over-all production expense. A relatively small number of castings frequently justifies die casting, because the need for costly machining tools and fixtures is eliminated.

The use of die castings reduces the time and expense required to complete the product. Assembly is rapid because light-metal die castings are uniform and faithful in dimension. Surfaces are smooth as cast, so that many finishing operations are simplified or eliminated.

Frequently the use of die castings is very advantageous as a measure to conserve plant facilities. The die caster supplies castings with the flash trimmed off, and in many cases they are almost ready for assembly. The multitude of operations that would be required with other fabrication methods, but which are eliminated by die casting, can free needed productive capacity for other uses.

Die Castings of the Light Metals, Aluminum and Magnesium, Offer Important Advantages

Notable design and product advantages are gained by using the light alloys for die casting.

Light Weight of die-cast parts cuts down the dead load that other structures must carry. Moving parts, especially, benefit from weight reduction.

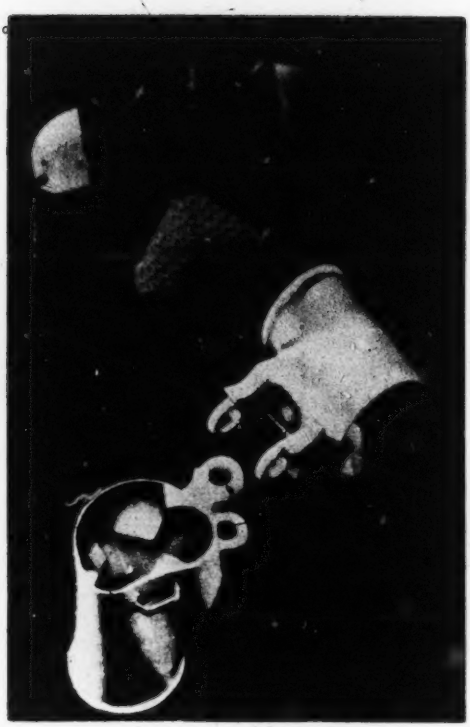


Figure 1—Produced in an Alcoa die-casting plant, these magnesium binocular bodies are light and sturdy.

Permanence of dimensions assures accuracy and interchangeability. The light metals are free from creep under sustained loads.

Higher Temperatures than other die-casting alloys permit are possible with aluminum and magnesium without excessive loss of physical properties or dimensional accuracy.

The use of die castings may originate in either a program of manufacturing cost reduction, or in a desire to improve product design, or both. Suitable applications and appropriate casting designs make both goals readily attainable.

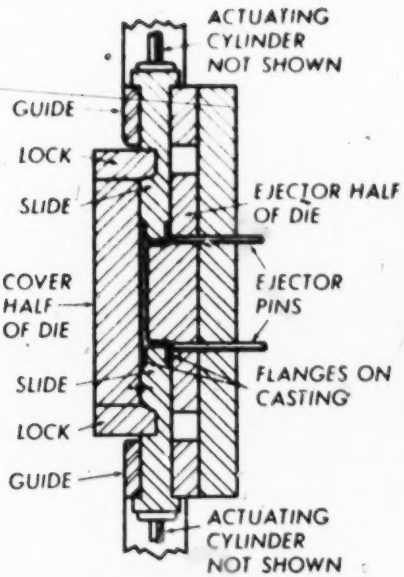


Figure 23—The flanges on this casting produce undercuts that are formed by movable slides.

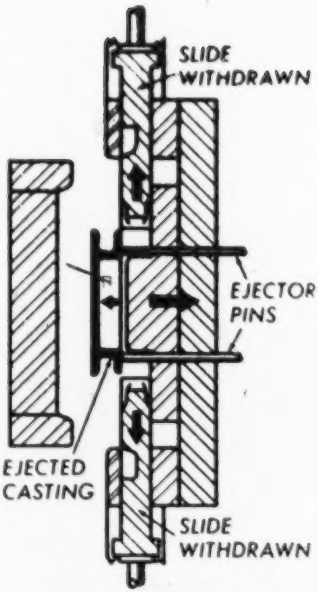


Figure 24—The slides are pulled free of the flanges before the casting is ejected.

Frequently a recess on the side of a casting is so placed that it would prevent separation of the die halves or ejection of the casting from a simple die. Such a recess is called an "undercut." The undercut surface of the casting is formed by a suitably shaped sliding block in the die. This type of core is called a "slide." It may, in turn, have fixed cores mounted on it, parallel to the sliding motion.

Movable cores and slides must be closely fitted to the surrounding portion of the die. Leakage of metal into the sliding surface clearances will cause the moving parts to bind.

Four methods of actuating movable cores are in common use: (1) Small cores may be operated manually by a rack-and-pinion mechanism similar to that used for the ejector plate. (2) A toggle linkage may be employed. The self-

locking action of a toggle holds the core in place if it must be situated where a conventional core lock would be impractical. (3) Cores may be withdrawn by the relative motion of the separating die halves. A sloping cam pin, mounted on the cover half, engages a hole in a sliding block that holds the cores. The block moves the cores in and out of the ejector half as a result of the angle at which the pin is set. (4) Hydraulic pistons, operating cores and slides, can be controlled by valves that are opened and closed either manually or automatically.

Occasionally, die castings require movable cores that cannot be operated by the methods just described. A typical example is an undercut cavity inside a box-shaped casting. Such undercuts can be cored with "loose pieces." These cores are placed in the die by hand before each shot. They are designed to be locked firmly in place when the die is closed. After the shot, the loose pieces are ejected with the

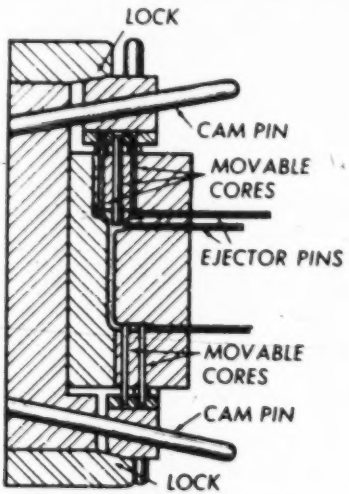


Figure 25—These movable cores in the ejector half are operated by cam pins secured in the cover half.

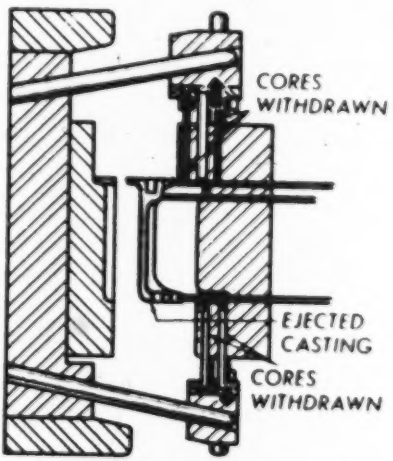


Figure 26—The cam pins pull the cores automatically as the die halves separate. Then the casting can be ejected.

casting, then removed from the casting and reset in the die. Sometimes several sets of identical loose pieces are used in one die to reduce the waiting time between shots. However, even when handled with maximum efficiency, loose pieces slow down production. For this reason, and because loose pieces make dies and die maintenance expensive, it is de-

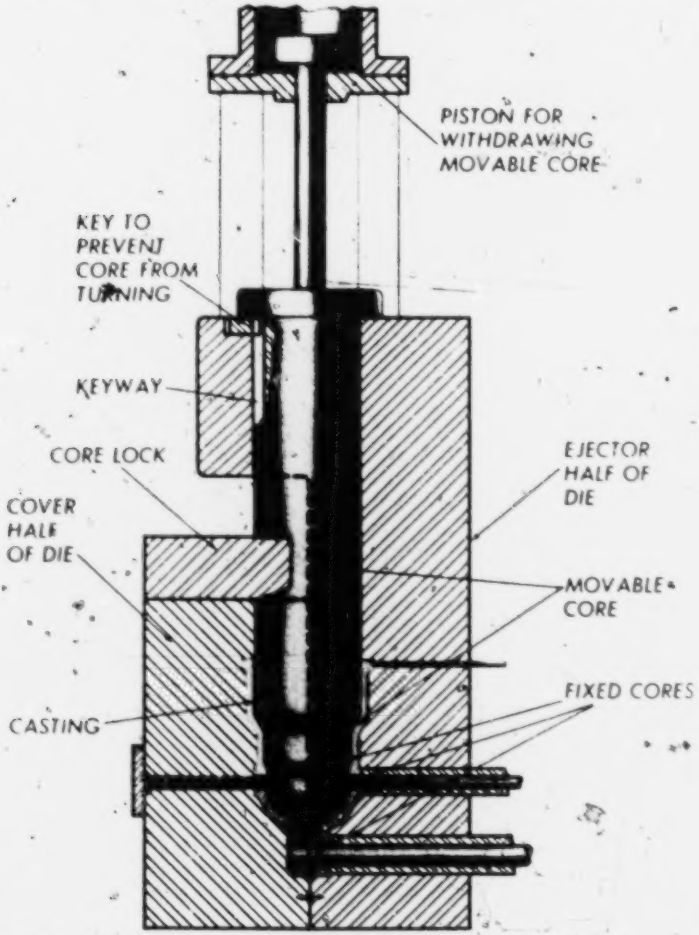


Figure 27—A large movable core forms the interior of this die casting.

sirable to modify designs with undercuts so that the use of loose pieces can be avoided.

When inserted parts, such as studs, bushings, etc., are to be cast in place, they are placed in the die by hand before each shot. The die must be provided with means for locating and locking each insert securely during the casting oper-

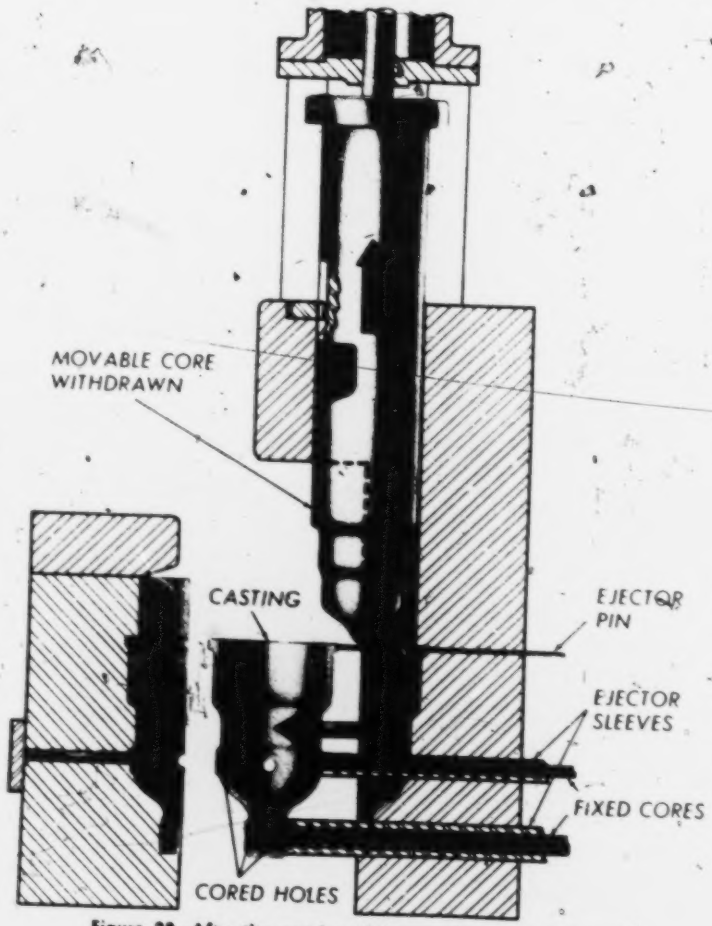


Figure 28—After the core is withdrawn, the casting is forced out by ejector pins and ejector sleeves.

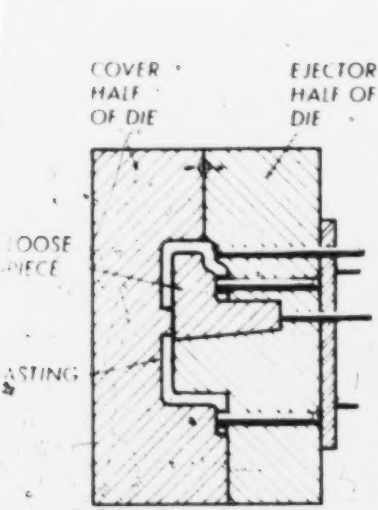


Figure 29—A loose piece is employed to core the undercut recess inside this box.

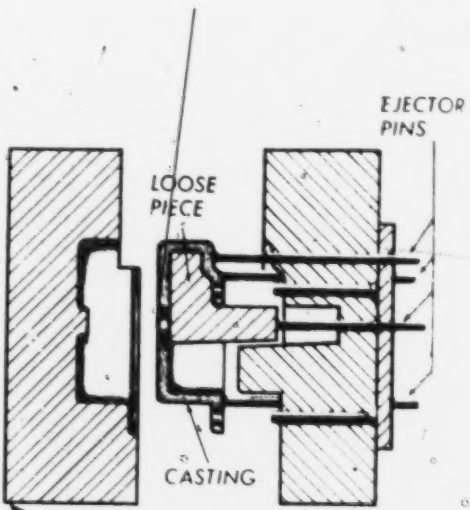


Figure 30—When the casting is ejected, the loose piece comes out with it.

Figure 31—The loose piece is removed from the casting.

ation. If necessary, the locking device is withdrawn in the same manner as a movable core to allow ejection of the casting containing the insert.

Multiple and Combination Dies Produce Several Castings per Shot

A multiple die contains a number of identical cavities, all gated from the same sprue hole. When the size of the die permits and when the quantities of castings justify it, the use of a multiple die can yield increased production at substantially lower cost.

Page of Transcript

The die-casting of that block would not involve any-
239 thing other than the use of the conventional die-cast technique in 1951.

The problem involved in die-casting engine parts for a two-cycle engine as compared with die-casting parts for a four-cycle engine are basically the same. As far as die-casting operations is concerned the machings we use would not know whether it was a part for a two-cycle or a four-cycle engine.

Exhibit D-3 does, or has incorporated in the die what is commonly known as cores kissing each other.

240 Q. Is there anything essentially different in the use of kissing cores to form the passages in the cover casting D-6 you have, as compared with the defendant Exhibit D-3?

A. No sir, basically they are the same.

241 *Cross Examination*

I never designed a gasoline engine. In our die-casting of different things we sometimes use inserts of some other metal than that of the rest of the casting in a die-casting.

Q. And then in the finished product that insert comprises a part of the complete casting?

A. It sometimes has, yes, uh-huh.

Q. It is an integral part of it, isn't it?

A. Yes, uh-huh.

We have been die-casting engine blocks like defendant's Exhibit No. D-10 for Clinton and Lauson. I believe it was 1953 we started. We started for both Lauson and Clinton about the same time.

Page of Transcript

242 CLETUS V. ERLACHER

Direct Examination

242 Cletus V. Erlacher, Jr., Maquoketa, Iowa. I started with Clinton Machine in 1946 in the material control department and as well as in shipping and receiving. I, in 1947, was given the opportunity to represent Clinton Machine as a field representative, and continued to represent them as a territorial representative through 1951 at which time I was made assistant sales manager, and continued as assistant sales manager until January of 1953.

243 I was made Sales Manager in January of 1953. I am familiar with the engine produced by Clinton during this period. In 1946 it was our 700 series.

244 In addition to the block, Exhibit D-101, for the completion of the crankcase of the horizontal 700 series engine it was necessary to have a base casting. Another main part employed to complete the crankcase on that engine was a removable wall which in engine terminology is called a bearing plate. It is needed to complete the enclosure for the crankcase. That was on the flywheel side of the crankcase. Exhibit D-102 is a fair specimen

245 of our kick starter base which is on our 700 series horizontal engine. The Exhibit D-102, was attached to Exhibit D-101 in this fashion, and required a gasket and two bolts for attaching to the cylinder block casting. These two mounting holes in the base align with the two drilled and tapped holes in the cylinder block, in this fashion.

Mr. Balluff: The witness is holding a base casting D-102 next to the cylinder block D-101.

The Witness:

The normal position of the cylinder and the crankcase in the 700 series horizontal engine is in this fashion. The

Page of Transcript

base rests on a surface of the cylinder block and the casting on top of it so that the crankshaft of the engine will be horizontal to both. In addition to Exhibit 102 Clinton
246 manufactured and adapted to the 700 series engine many different bases. I believe that at the last counting we were in excess of some 52 or 53 different bases.

STIPULATION: Clinton in connection with this horizontal 700 series engine, used a series of bases—the witness has testified there were some 52 in number and of which Exhibits D-101, -102, -103, and -104 are examples, and that these bases were used in connection with a horizontal 700 engine during the period 1946 and up prior to 1952. That is understood to be the horizontal crankshaft engine.

The Witness:

247 The main casting used in connection with all of these bases was the same casting. The reason for Clinton selling many different bases for the horizontal 700 engine was that due to the variable requirements of different manufacturers in adapting our product to theirs it was necessary to make these different bases to accomodate their application. This has been the practice within the industry for the period I have been in it. No changes at all
248 were required in the cylinder and crankcase casting to permit the use of the various interchangeable bases to which I have testified.

There is a substantial number of applications for the 700 series engine, but a few examples of what it was used on would be the power lawnmower, both rotary and reel, pumps, generators, coal conveyers, grain augers, garden tractors, rotating tillers, which is a representative list of the many applications the 700 series engine was sold for. In general we sell the majority of our products

Page of Transcript

to original equipment manufacturers, and in turn they sell their product with our engine on it to many manufacturers, distributors, dealers, and mail-order houses, large chains and the like.

249 The primary reason for the introduction of the VS 700 series engine was due to the demand being created by the rotary power lawnmower. The rotary power lawnmower having been conceived, you know, years prior to 1949, had always been an application whereby the use of a horizontal engine in conjunction with a twisted belt and mandrel assembly was required to complete the rotary type lawnmower. Previous to the introduction of the
250 VS 700 series engine there was on the market and sold commercially a vertical shaft two-cycle engine which had revealed to the manufacturers of lawnmowers the possibility of eliminating the expensive twisted mandrel assembly and twisted belt. It was because of the popular demand in this country for four-cycle engines, which was called by many manufacturers a four-cycle vertical shaft engine of which there was only to our knowledge one other being produced in May of 1949. The vertical shaft 700 series engine made it possible to produce a rotary power lawnmower at a much lower cost to the ultimate consumer and a reasonable profit to the manufacturer by the elimination of the mandrel assembly, twisted belts, and other items necessary. The principal use for the VS 700 series engine was for use on rotary lawnmowers. We have sold a substantial quantity of this VS 700 series engine in each year since the engine has been introduced. For the period in checking our records
251 it indicates we sold nearly half a million vertical shaft 700 series engines during the period prior to 1951, including 1951.

DEFENDANT'S EXHIBIT D-108

The Booming Market for POWER LAWN MOWERS

Mr. Briggs

Power mowers are being bought in increasing numbers by farmers and home owners, and the market has barely been scratched

By Sam Briggs
Sales Manager, Lawn Mower Division
Reo Motors, Inc.

THE power lawn mower industry is still new, still growing, still full of opportunities for manufacturers, for wholesalers, and for dealers. Only a few years ago power mowers were purchased only for mowing parks, cemeteries and the lawns of schools, colleges and large estates. No one thought of using a power lawn mower on less than an acre or more of lawn.

Nine years ago, in 1941, only 40,000 power mowers were produced by the industry. During the war none were built. In 1948 total power mower production was about 300,000, in 1949 about 400,000, and in this calendar year of 1950 production will exceed 600,000. This is an increase of one-third in 1949 and a further 50 percent increase this past year. Check your sales and see if you have kept pace with the industry.

There are today over 100 different manufacturers of power mowers. There are only about ten manufacturers who are doing a major job of engineering, production and merchandising of power mowers on a national scale. These ten manufacturers have produced over 90 percent of the power mower volume. They have prospered, and are splendid examples of what can be accomplished in business under the principles of free enterprise.

At least 300,000, or one-half, of the power lawn mowers manufactured this year have been sold by large national accounts, the rubber companies, and the auto accessory chains. Probably 200,000 power mowers, or one-third of the production, has been sold by wholesalers.

Power lawn mowers are being purchased today to mow parks, cemeteries, and the lawns of schools, institutions and large estates, the same as in years past. The large group of purchasers, however, is made up of professional people, white-collar workers, the skilled and the semi-skilled wage earners. With the average family income now above $3,600, power lawn mowers are no longer regarded as a luxury.

There is a basic need for power lawn mowers. They are being used with satisfaction on even small lawns. This is a mechanized age. The businessman, the factory worker, the farmer, after working with modern office equipment, precision machinery, with tractors and modern equipment can not be contented to mow the lawn except with power.

The remarkable increase in the power lawn mower market has not come about because of economy. It is true that they do save some time and money. However, many of us could never justify the purchase of an automobile today merely to save expense of transportation. We purchase automobiles because they are modern, because they are handy and convenient, because the neighbors have them, because it is fun to drive them, and because they are part of our way of life.

Power lawn mowers are being purchased for the same reasons: they are handy, they are convenient; it is fun to mow a lawn with a power mower; they are a part of our modern way of living. Any man with some grass to cut is a prospect.

Only a few years ago it was the trend of our fathers to want to sell or retire from the farm and move to the city where they could enjoy the conveniences of electricity and running water. Today the conveniences have gone to the farm. It is our ambition to leave the hubbub of the cities, and to move back to enjoy the peace and quiet of country life. Each year there are more people working, earning more money, building more homes, and there is a definite movement towards suburban areas, where they have better lawns. When driving along the highways, look at the lawns. Each year the farm lawns seem to look not only better kept, but larger. Farmers are purchasing power mowers by the thousands.

A conservative estimate is that the market for small and medium-sized power mowers is not over 15 percent saturated. It hasn't been touched yet.

There are several different sizes and types of power lawn mowers. The 20-inch and 21-inch cut sizes seem to be the most popular, followed by the smaller 18-inch and 19-inch as second in popularity. The 22 to 25 inch sizes are third in volume. Power mowers of 30-inch width and up are a specialty and sell only in small volume.

There are two general types of power lawn mowers, the revolving reel type and the rotary cutter type. The revolving reel type of power mower is regarded as the most satisfactory for mowing average lawns.

Rotary power mowers are used primarily for cutting taller grass, but in many cases are used suc-

cessfully for a combination of lawn mowing, for cutting the high grass on vacant lots, around farm buildings and similar areas. The rotary mower does not do an entirely satisfactory job of mowing a good lawn, but as a combination machine where there is a variety of cutting to be taken care of it is gaining in popularity.

The rotary type mower has been especially successful and popular in the South, where there are many types of wild grasses which come up quickly in lawn areas such as wire grass, witch grass and weeds which grow quickly.

There is a tremendous potential market for electric power mowers, yet untapped and undeveloped. The dealer, however, must bear in mind that electric power mowers are suitable only for small lawns, which can be mowed in a few minutes with a hand mower.

The name "electric power mower" is magic. When you say, mow with electricity, no fuss, no muss, no noise, no smelly gas, just plug it in like a vacuum cleaner, it is a natural for merchandising. Actually, the cord on an electric mower is not a great handicap—no more so than the cord on a vacuum cleaner. The customer with a small lawn, who comes in to buy a $35 hand mower, can be "sold up" to an electric mower. But we must be careful not to oversell the electric mower. It is a mower for small lawns only. It is not a satisfactory mower for large lawn areas.

During the past few years, the wide-awake manufacturers of power lawn mowers have done an outstanding job advertising in the trade papers and in the national magazines. I am sure that advertising has been a most important factor in creating a desire for power lawn mowers and in acquiring their status as a household necessity.

Good, aggressive advertising has paid off well for all manufacturers who have tried it. Good, aggressive advertising has paid off well for all wholesalers and dealers who have tried it.

Many times I have been asked, "When is the best time to advertise power lawn mowers?" Most bathing suits are sold in the summertime in hot weather. Most power mowers are sold in the spring and summer. My answer to the question is, watch the weather.

Start your advertising early. Try to splash large ads at the right time. Tie in with some of the national ads of the mower manufacturers if possible. Warm weather brings people in to buy, not only power mowers, but lawn seed, garden seed, lawn tools, fertilizer and all of the things that go into the ground and onto the lawn in spring. When old Mother Nature goes to work, that is the time to splash big ads. The success of an advertising campaign does depend upon the timing.

Power lawn mowers need to be displayed. Floor displays to be effective should be kept clean, should allow sufficient room so that the prospect can move around the mower, take hold of the handle and size it up in general. Window displays are very effective, and sidewalk displays are always eye catchers.

It is important to keep the machines clean, to give them room. In a sidewalk display, where possible, the engine should be started and the prospect given every opportunity to look the machine over carefully and actually run it himself.

Lawn displays, of course, are best of all. The dealer who is fortunate enough to have a small lawn in front of his store or perhaps next door, has a golden opportunity to create additional sales through the magic of demonstration.

It is of the utmost importance for dealers to have time payment plans available on power lawn mowers. It is just as necessary as on refrigerators, radios, television, furniture and similar items. The home-owner, or the home-renter, who purchases a power lawn mower is an exceptionally good credit risk, much better than the average purchaser of a radio. Local banks and loan companies have recognized that a power lawn mower time contract is a good risk, and in many cases have been taking such paper without recourse on the dealer. At the present time, Regulation W issued to curb credit extension does not cover power lawn mowers. This should be a real sales help.

The large national chain stores handling power mowers aggressively, solicit time payment business, and during the past year have sold about 40 percent of their volume on time.

During the past 20 years there has been a phenomenal growth in time selling, and it is unfortunate that independent merchants have not been getting their share of such business. In many cases, they have been not only unable, but unwilling to handle credit selling.

It is consumer credit that has enabled the American skilled and semi-skilled workers to buy more merchandise. Consumer credit expansion is, of course, now being curbed, but time payment selling is here to stay, and the independent merchant who wants to participate in the phenomenal growth of sales for power lawn mowers, or major home appliances, or any other big ticket items must offer time payment and budget plans to his customers.

(Continued on page 44)

Demonstration of the correct size and model power lawn mower to a known prospect is the most effective known method of making a sale.

The Market for Power Lawn Mowers

(Continued from page 38)

It seems to me that one of the most important tasks before wholesalers today is to assist merchants in working out plans so that they can be competitive by extending consumer credit. Banks and lending institutions will cooperate willingly to work out intelligent and workable time payment plans. The chains, with their generous extension of credit, their aggressive sales and advertising methods, have made serious inroads into the business of independent wholesalers and retailers. The chains already have nearly 50 percent of the power lawn mower business.

It is not a particularly difficult task for a wholesaler to increase his power mower sales. Wholesalers who have merely stocked and shown power mowers in their catalog have not been successful. The successful wholesalers have regarded power lawn mowers as they should be regarded—high ticket, major dollar profit items on which the expenditure of special sales and advertising, and general promotion effort is necessary and justified. From the head office right down through the organization they preach the fact that the power lawn mower business is good business, important business, profitable business which they expect to get.

Mark-ups Satisfactory

There are, however, many retailers who have lost money by purchasing off-grade or unknown brands because of the lure of extra or special discounts. In fact, many of the leading department stores have gone sour on power mower sales because they purchased discounts, or special deals, and ended up with their basements full of unsold machines. The present mark-ups on power mowers have been established gradually over a period of years and appear to be workable for manufacturers, wholesalers and retailers.

I am frankly puzzled by the occasional department store where it appears to be the policy to purchase discount and not turnover with resultant dollar profits. I am well aware that there are two sides to the "major unit of sale, gross dollar profit" premise. Whether it be on automatic washing machine or a power lawn mower:

1. The unit of investment is large.
2. The turnover is seasonal and may be slow.
3. There is danger of obsolescence.
4. A power mower should be set up and serviced before delivery, which costs money.
5. It takes a high priced, qualified and instructed salesman to sell power mowers. Any clerk can sell traffic items.
6. On power mowers there may be some service required after the sale is made.

It is because most retailers are unwilling or unable to do these required things that the opportunity is so great for those who have the facilities and the energy to do the job. All of us recognize that it requires a different type of selling to sell power lawn mowers than traffic items. Specialized selling does require good sales people, hard work, and a knowledge of the product.

I particularly want to stress the importance of the power lawn mower salesman knowing his product. It has been proved time and time again that a salesman who has actually unpacked, assembled and mowed a lawn with a power mower is a much better salesman than the one who merely sells from a catalog or from the floor. Salesmen should study all available material, but they should also get out and cut grass.

Wholesalers and retailers will find it worthwhile to stock repair parts and operate service shops. If it is impractical to do this, then they should make arrangements with some satisfactory service shop to handle parts and service. The mower manufacturer will assist in making these arrangements. There are many ways of handling service, but the point I want to make is that wholesalers and retailers must take the responsibility for service—either handle it themselves, or work with and encourage other service shops.

All of us are wondering about the prices on power lawn mowers. None of us know just what is ahead. However, it would appear that increases may not be over.

Price is an important item in merchandising power lawn mowers, but it certainly is not the most important.

Are power lawn mowers going to be available in plentiful supply during the coming season? Our United States economy is entering a new phase, we are now rearming in the midst of high civilian production. The rate of defense spending is rising. Our first job is to rearm. The defense order priority system is being used to channel all materials needed into war work. Now, in addition to the overall priority system, special restrictive orders are being issued covering the use of such scarce materials as copper, zinc, aluminum, cobalt and rubber. All of these scarce materials go into the manufacture of power mowers.

Future Outlook

Probably the industry can continue to produce a fair volume of power mowers even with a cut back on aluminum, copper, zinc, cobalt, manganese and rubber, but what is going to happen if it is necessary to restrict the use of iron and steel?

Production of power lawn mowers this past fall and winter has been at an all-time high, but mowers are selling readily at retail. Stocks as of January 1st in the hands of manufacturers, wholesalers and retailers were probably about the same as a year ago.

I am sure that every major manufacturer of power mowers is doing his best to produce mowers on a businesslike basis. I do not know of a single manufacturer who will not consider himself fortunate if materials are available to produce as many power mowers during the first six months of 1951 as he produced during the same six months in 1950. That was a lot of mowers. It may or may not be sufficient to supply the demand next spring, but it will take some selling if that many are produced so let us not let up in our selling efforts.

There is surely cause for concern for business in the months ahead, but production continues high and the power mower business has not suffered greatly so far. No one knows what the present situation may develop into, but manufacturers, wholesalers and retailers—all of us—will surely come out best in the long run by avoiding speculation, adhering to sound operating practices, keeping up the quality of our merchandise and service, and meeting each new situation with resourcefulness.

CUT IN on the POWER MOWER BOOM

Reprinted for your convenience
from the JUNE 1951 issue of
ELECTRICAL MERCHANDISING.

CUT IN on the POWER MOWER BOOM

A 70% sales increase last year made power mowers an $80-million business—yet fewer than four out of 10 appliance dealers are handling this newest and most popular sideline. Service is negligible, prices start in the fifties and the average home owner is today's top prospect

By JOHN DECKER

FOR the average property owner the "day of the power lawn mower" appears to be here to stay.

In the postwar period alone, power mower sales have skyrocketed until today many observers believe the annual volume of the approximately 100 manufacturers in the field approaches $80,000,000. To realize what a yearly turnover of this magnitude might mean to the appliance dealer one need only check the sales of comparable electrical appliances. With the exception of the larger "white goods" few of these can boast of a figure even close to this, despite the fact that most appliances are year round sellers, *while mowers reach their peak sales period during the spring and summer months only.*

EDITOR'S NOTE: This is the third in a series of articles on merchandise sidelines suitable for handling by appliance dealers. The first, Pots and Pans Draw Appliance Prospects, appeared in November, 1950, and the second, Greeting Cards Pay the Rent, was published in December, 1950.

The Market. There for the Taking

Estimates as to the number of power mowers in actual use show wide variation, but a majority of spokesmen are agreed in their feeling that the present market is probably no more than 10 to 15 percent saturated at most.

The Philadelphia *Bulletin* in a recent survey sampling the demands of greater Philadelphia discovered that some 80 percent of the suburban families in that area alone had lawns. Of this total 71.2 percent owned a lawnmower, 94.8 percent of these were hand mowers and only 6.6 percent were power units, an indication of the vast national market existing for this latecomer to popularity in the ranks of home labor saving devices.

Why then the hesitancy on the part of the appliance dealer to include power mowers in his line? In 1949 ELECTRICAL MERCHANDISING, in a survey conducted among 1,739 appliance dealers in 48 states, found that only 37.16 percent handled mowers as part of their stock in trade. Most of the larger manufacturers in the field offer discounts of approximately 25 percent, with additional allowances for quantity purchases. While this is short in comparison to appliance discounts, it is nevertheless well for the dealer to consider the self selling characteristics of the power mower during its annual summer appearance.

Power mowers, unlike the variety of other appliances on the home scene, are almost exclusively a man's machine. This popular appeal for the average male probably stems from a man's interest in anything mechanical, plus the fact that traditionally he has been saddled with the weekly grass cutting task. In decisions affecting the purchase of most home appliances, the woman's voice is an important factor to consider. With the power mower it is a different story. A man who owns even a small lawn area and who has an income of $3,750 a year, or more, may consider the power mower a necessity rather than a luxury.

That the lawn area necessary to the support of a power mower need not be large is amply illustrated by a study conducted by Toro Manufacturing Co. in the autumn of 1950. Among the owners who responded, 73 percent had a half acre or less of lawn area to care for, an illustration of the fact that power mowers are no longer the exclusive pet of the country club. As Sam Briggs, sales manager of Reo Motor's Lawn Mower Division recently put it, "Power mowers have become a part of our way of living. And the market hasn't even been tapped."

The Mower's Family Tree

For the dealer planning the addition of a line of power mowers to his present stock, a certain amount of historical background material is necessary in order that he may know the failings and good points of the product. The original means of cutting grass, a series of rotating blades mounted and turning on a central shaft, appears to have originated in England sometime in the early part of the nineteenth century. This simple mechanism has not changed to any great extent since its inception, and today remains the basic design around which the majority of power mowers are built. Lightweight alloys have been incorporated in various parts of the motor, housing, and structural portions of the modern product, but the cutting mechanism still remains much the same as when first conceived 120 years ago. This is the reel type mower and the type which the average buyer will first turn to when considering purchase. In doing so he has chosen the type which has been generally favored for use on a well graded lawn.

He is, however, overlooking the potential of the newer, rotary types. According to some spokesmen, the reel type mower possesses one bad feature: it will not cut with any degree of accuracy when rank grass growth of more than average height is encountered. Various methods were tried throughout the years to correct this failing, but not until 1935 did an inventive individual hit upon the idea of a mower which presented a blade rotating parallel to the ground. Thus the rotary mower came into being and by undercutting grass in the same manner as a scythe, it manages, according to the industry, to do a job not only on fine lawns, but on long stemmed growth as well. In addition, it is also claimed that the rotary will shred grass cuttings to a fine mulch before redistributing them onto a lawn.

Indications are that the rotary now

PRICES START AT $52.95

LEAST EXPENSIVE power mower on the market is the electrically powered rotary mower made by the Huffman Mfg. Co. to retail for $52.95.

JUST UNDER $100, the Roberton mower made by King Pneumatic Tool Co., Chicago, cuts a 20-inch swath, is powered by a 9/10 hp Briggs & Stratton engine.

accounts for some 25 percent of annual power mower sales in the nation. Cumulative dollar sales of the top twenty manufacturers showed an increase of almost 135 percent for the rotaries when final sales tallies for 1950 were compared with 1949. Reel type power mowers could almost of an increase of 60 percent during the same period. This popularity of the rotary should continue to follow an upward trend in future, though it is doubtful that the older and better known reel types will ever completely topple from the commanding spot which they have enjoyed for so many years.

The least known of all power mower types on the market today is the so-called sickle bar. It too follows the scythe principle of cutting grass, but since it is intended primarily for very heavy duty operations, it is not generally in demand by the average buyer.

The Buyer's Interests

The inroads which power mowers have made into the sales of manually operated machines are evident from the figures of the top 20 manufacturers in 1950. During this period yearly net dollar sales of hand mowers had risen perhaps 12 percent over 1949. *Power mowers of the two most popular types (reel and rotary) had registered a stupping increase of almost 70 percent.* This rising tide of public acceptance has stemmed partially from higher labor costs which have made employment of the yard boy the exception rather than the rule. In addition, it is evident that the public has become sufficiently educated to appreciate the labor saving possibilities inherent in the power mower. This approval has been fostered by the manufacturers themselves, a factor which has helped immeasurably to make the dealer's selling job easier.

Blade Size Important

In selecting their power mower, regardless of the type chosen, the average buyer will register an initial interest in the cutting size of the blade. Toro Manufacturing, in their survey, discovered that among 38.6 percent of a selected number of purchasers of their product the following blade size preferences prevailed.

Size of Blade	Percentage Owning
16"	9.59
17"	16.84
18"	18.91
19"	1.04
20"	4.14
21"	44.30
22"	2.07
24" 30" 31"	3.11
	100.0

With slight variations brought about by climatic necessity and regional preference it is a safe assumption that the sizes shown follow a more or less national pattern. The larger cutting edges would of course be most popular in the South and Southwest where grass growth is heavier and faster. To realize the full sales possibilities of the power mower the dealer must consider carefully the types most suited to his particular locale. A majority of suburban areas will call for smaller, lighter units, while more rural neighborhoods will of necessity be prime targets for larger, more powerful machines. Customers will as a rule show the most interest in the smaller units, but should be cautioned against restricting themselves too greatly. An

(Continued on next page)

AUTOMATIC REWIND starter is outstanding sales feature on Reo's Royale De Luxe, a 21-inch mower with a 1¾ hp engine and retailing for $124.50.

GASOLINE powered rotary made by Pioneer Gen-E-Motor Corp. features molded aluminum frame, low weight (70 lbs.) and price of $109.50.

A PARTIAL LISTING OF MANUFACTURERS OF POWER DRIVEN LAWN MOWERS

Cooper Manufacturing Co.
411 First Avenue
Marshalltown, Iowa

Davis Corp., G. W.
Richmond, Indiana

Eclipse Lawn Mower Co.
Prophetstown, Illinois

Fairbanks Morse and Co.
600 S. Michigan Avenue
Chicago 5, Illinois

Falls Products, Inc.
Geneva, Illinois

Heineke and Co.
1900 South Eighth Street
Springfield, Illinois

Huffman Manufacturing Co.
117 Gilbert Avenue
Dayton 1, Ohio

Jacobsen Manufacturing Co.
742 West Washington Street
Racine, Wisconsin

Johnson Lawn Mower Corp.
Ottumwa, Iowa

King Pneumatic Tool Co.
Chicago, Illinois

Moto-Mower Co.
4624 Woodward Avenue
Detroit, Michigan

Pennsylvania Lawn Mower Works
American Chain and Cable Co.
Camden, New Jersey

Pioneer Gen-E-Motor Corp.
Pincor Products
5841 West Dickens Ave.
Chicago 39, Illinois

Reo Motors, Inc.
Lawn Mower Division
Lansing 20, Michigan

King Pneumatic Tool Co.,
Roberton Div.
27217 N. Ashland Avenue
Chicago, Illinois

Sensation Mower, Inc.
Ralston, Nebraska

Savage Arms Corp.
Lawn Mower Division
Chicopee Falls, Mass.

Toro Manufacturing Corp.
3042 Snelling
Minneapolis, Minn.

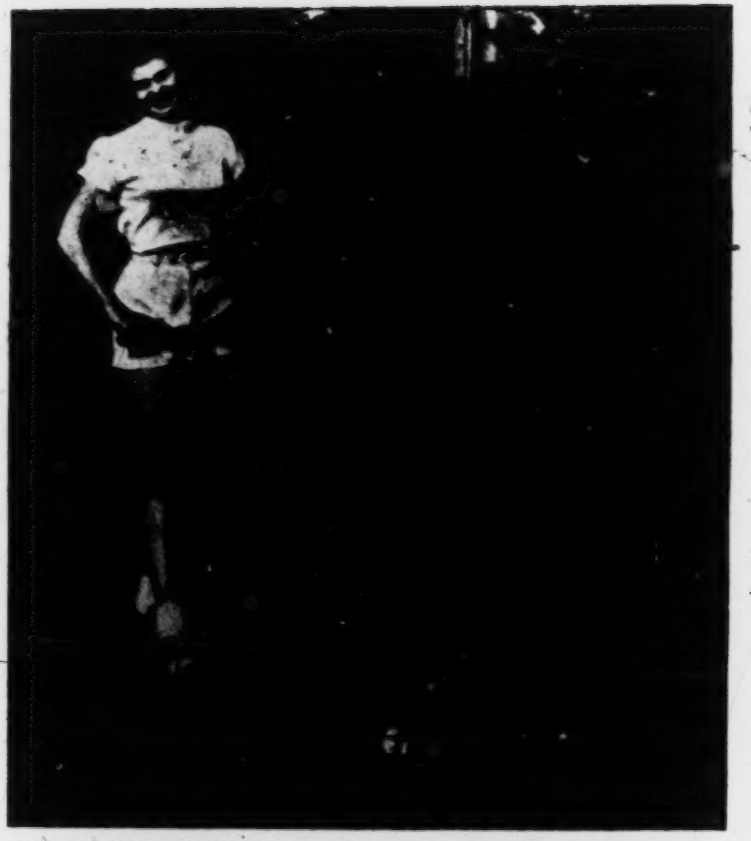
Western Tool and Stamping Co.
Des Moines, Iowa

Worthington Mower Co.
Stroudsburg, Pa.

Yard Man, Inc.
Jackson, Michigan

HOW BIG A YARD HAS THE POWER MOWER OWNER?

Overall Size of Areas Mowed by



ROTARY MOWERS, like this Toro Manufacturing Company model, cut long or short grass, are growing in popularity.

MANY TYPES OF MOWERS DO ALL KINDS OF JOBS

CUT IN ON THE POWER MOWER

oversmall model for a specific job will not wear as long, or as well, as a larger one, and this should be thoroughly explained to the buyer.

The Price Remains Low

Among appliances, power mowers alone appear to be one of the few items on sale in today's market which have resisted the trend towards higher prices. The smaller and most popular types, with cutting blades of from 18 to 21 inches, have not increased appre-

Dealers should plan to meet the varying demands of the public by stocking at least two or three models in several different lines. In addition, they should have an adequate inventory to accommodate the brisk trade that this May to August business invariably brings. They should remember, too, that the prospective purchaser of a power mower is a remarkably good credit risk, partly because of the responsibility which home ownership engenders, and more particularly be-

Chicago, Illinois

Moto-Mower Co.
4624 Woodward Avenue
Detroit, Michigan

Worthington Mower Co.
Stroudsburg, Pa.

Yard Man, Inc.
Jackson, Michigan

HOW BIG A YARD HAS THE POWER MOWER OWNER?

Overall Size of Areas Mowed by 195 Buyers of Power Mowers*

Approximate Total Area in Square Feet	Approximate Acreage	Percent of Total
1,000 to 5,715	1/8	6.1
6,000 to 7,900	1/6	11.2
8,000 to 9,750	1/5	13.1
10,000 to 11,900	1/4	9.8
12,000 to 13,500	3/10	5.6
14,000 to 15,400	1/3	11.2
16,000 to 17,600	2/5	3.3
18,000 to 19,000	2/5	1.9
20,000 to 22,900	1/2	10.8
24,000 to 26,970	3/5	1.9
28,000 to 30,550	7/10	4.7
32,000 to 33,750	3/4	2.3
26,000 to 39,000	9/10	.9
40,000 to 43,870	1	6.5
44,000 to 47,500	1 1/10	1.4
48,000 to 90,000	2	6.5
Over 100,000	2 1/3 acres or more	2.8
		100 Percent

* Survey figures courtesy Toro Mfg. Co.

oversmall model for a specific job will not wear as long, or as well, as a larger one, and this should be thoroughly explained to the buyer.

The Price Remains Low

Among appliances, power mowers alone appear to be one of the few items on sale in today's market which have resisted the trend towards higher prices. The smaller and most popular types, with cutting blades of from 18 to 21 inches, have not increased appreciably in cost over 1942's average figure. Thus a representative power mower was readily obtainable last year for $99.50, and this year's prices have not risen sharply above this figure. Some machines are on the market at present selling for $79.50, and one enterprising concern manufactures an electrically powered rotary retailing for $52.95. Industry spokesmen are understandably reluctant in the face of rising prices to discuss just how long they will be able to hold the price line. Most, however, are agreed that the cost of small, gasoline engines will be one of the decisive factors. Generally speaking, the heaviest consumer demand falls upon those power mowers which are priced slightly above $100. One of the larger distributors in the New York area has pinpointed this even further with the statement that 80 percent of his calls are for machines which will be placed on the market at prices ranging from $110 to $130, a figure which appears to rank closely with that prevailing throughout the rest of the country.

Dealers should plan to meet the varying demands of the public by stocking at least two or three models in several different lines. In addition, they should have an adequate inventory to accommodate the brisk trade that this May to August business invariably brings. They should remember, too, that the prospective purchaser of a power mower is a remarkably good credit risk, partly because of the responsibility which home ownership engenders, and more particularly because of his higher than average income. Toro's survey brought forth the fact that 94.5 percent of all buyers of their product were home owners.

Repairs No Problem

While repairs necessary to the continuing good health of the modern power mower are few and far between, an adequate and varied stock of replacement parts is a prime requisite. The dealer should not construe this as meaning that the addition of a line of power mowers will bring with it a large bag of repair problems, and the attendant loss of customer good will. Most name brands will give many years of trouble free service to their buyers, and happily those few repairs that will arise with even the best of products are easily handled by dealers whose facilities include even small shops devoted to refrigerator and washer upkeep.

In keeping with most other appliances, the dealer who knows his mower and is able to deliver a convincing sales talk on the merits of the

BOOM (continued)

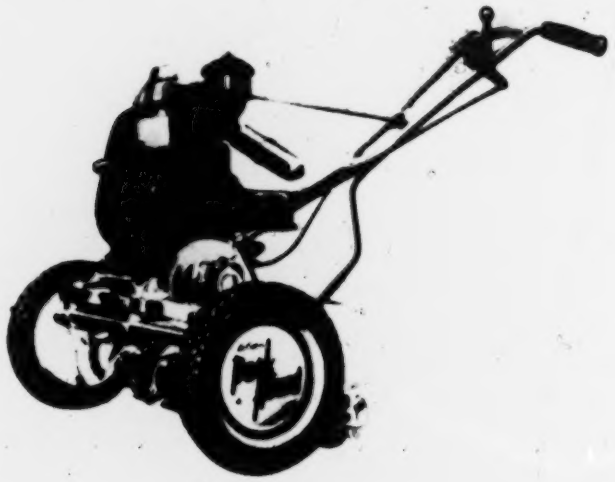
product will find the battle half won. In their service, I refer to any direct or indirect influence on the decision motivated final purchase. In almost 84 per cent of all cases, the mower on hand held the next bracket, and the balance of replies included such reasons as having to consult with someone.

On property the dealer must arrange to have the power mower displayed in a sufficiently large space so that the prospective customer may move the unit around, and generally take the measure of the machine in which he is interested. Those dealers fortunate enough to possess a small lawn space adjoining their place of business will immediately recognize the possibilities of a "live" display, during which the mower may be started and handled by the prospect, a sales technique which invariably leads to the conclusion of a sale.

It's Up to You

For a fifty three year period power mowers have been known and marketed in the United States. During the greater part of this long span of years they enjoyed the relative seclusion of the large estate, the country club and the cemetery. Those few hardy souls who were interested approached purchase with extreme reluctance. 1942 saw the first great sales spurt, and while no mowers were constructed during the war years, and few in 1945, the public remembered when the war was over. Sales have risen steadily since 1946. And they will continue to rise. *End*

HEAVY-DUTY mower, designed, as the name implies, for park-like areas, is made by Eclipse.



ELECTRIC, reel-type mower made by Reo is designed for small lawns, has 18-inch blades.

THIS $37.50 lawn sweeper is a product of Western Tool & Stamping Co.

HEDGE CLIPPERS are not new on the market, but electric models like this $37.50 product of Pioneer Gen E-Motor make a boring job lots easier.

Using This Issue

ONCE again ELECTRICAL MERCHANDISING brings you its Annual Statistical and Marketing Issue. Months of work and thousands of dollars have gone into its creation. Hundreds of people have cooperated with us to make possible the publication of the statistical material—figures that have long been accepted by the appliance-radio-television industry as the most authoritative to be found anywhere. It is a job that the staff of this magazine takes natural pride in presenting to its readers.

HOWEVER, it is not our intention here to put ourselves on the back; but to try to point out that, properly used, this issue can become an invaluable tool in your business. Statistics by themselves mean little. But when applied to specific day-to-day problems, they become charged with meaning and significance. Knowing how many washers, or refrigerators or TV sets were sold nationally, or what percent of the nation's consumers own them, may seem academic to Joe Zilch, who just lost a sale to a cut price artist down the street and who has a payroll to meet the next day. But those same figures broken down to his local market can tell him at a glance the sales trend and the sales potential for a particular appliance. National market and sales statistics, in the end, are no more than the collective figures for thousands of local markets. And every time a local dealer's cash register rings up a sale, it becomes a measurable statistic with numerous implications. It means a customer was wooed away from spending his money elsewhere, it means another unit of public acceptance of our products, it means another notch in the "saturation", or ownership factor of that device, it means a customer removed from the market for a period of years, it means in the case of a radio or TV set, another unit added to the listening or viewing audience, or, in the case of a washer, another customer lost to the commercial laundry. It means a fractional increase in the utility's residential load, it means continued employment and income for the men and women who build the product. It also means a statistical notch in the profit of the manufacturer, the distributor and the dealer.

While a sale, therefore, is a dry statistic it carries with it profound economic implications. And in measuring the progress of these isolated sales in every corner of the country, we not only arrive at totals of a staggering magnitude, but are able to assess the progress of an industry and a change in the living habits of a nation.

IN this issue the careful reader is provided with many clues to the effect of sales in our business. He is given an historical record for purposes of comparison year by year, he is given a cumulative index of ownership to point up potentials of specific products, he is given a seasonal index to determine optimum sales periods, he is given breakdowns of sales and ownership by states and by regions within those states. He may ascertain, furthermore, the extent of the replacement market, the percentage of the business involving traded-in merchandise and the eventual disposition of trade-ins, he is provided with background statistics on general business conditions—employment, incomes, savings, installment credit, new home construction, etc. He is furnished a breakdown of the country's wired homes—our basic market—by states and by urban and rural classifications. He can find out sales per thousand customers in any area of the country from data supplied by utilities serving those areas. He can even find out the number of other dealers competing with him in a given area. And, finally, he is informed as to the probable course sales will take in the year ahead.

IN other words, all the necessary information for intelligent sales planning is wrapped up in this package. If you know the extent of your market, know your potential prospects, know the degree of acceptance and present ownership of the products you sell, know what ratio of your sales will require replacing existing or obsolete equipment, know the number of your present customers who can be sold new devices and know when and where appliances generally sell best, you have eliminated a lot of guesswork and provided your business a sound basis on which to operate.

This issue is a tool to use in your business. We hope you find it useful.

Larence Wray

Editor

This editorial written for dealer and distributor readers of last year's Statistical Issue of ELECTRICAL MERCHANDISING, *is just as applicable now. While you are primarily interested in* ELECTRICAL MERCHANDISING *as an advertising medium, we believe it serves to explain why 40% of* ELECTRICAL MERCHANDISING*'s dealer subscribers will still have the January Statistical Issue eight months after it appears.*

INDEX OF SATURATION

January 1, 1956

All figures except radio based on 46,000,000 domestic and farm electric customers. Radio based on 48,158,600 total homes.

Number and Percentage of WIRED HOMES WITH			Number and Percentage of WIRED HOMES WITHOUT	
2,585,000	5.6	AIR CONDITIONERS (room)	43,415,000	94.4
5,351,000	11.6	BED COVERINGS	40,649,000	88.4
2,346,000	5.1	BLENDERS	43,654,000	94.9
5,528,000	12.0	BROILERS	40,472,000	88.0
40,235,000	87.5	CLOCKS	5,765,000	12.5
14,817,500	32.2	COFFEE MAKERS (automatic)	31,182,500	67.8
450,000	1.0	DEHUMIDIFIERS	45,550,000	99.0
1,838,000	4.0	DISHWASHERS	44,162,000	96.0
4,213,000	9.2	DRYERS, CLOTHES (electric and gas)	41,787,000	90.8
2,553,000	5.6	FOOD WASTE DISPOSERS	43,447,000	94.4
7,715,000	16.8	FREEZERS	38,285,000	83.2
11,675,000	25.4	HEATERS, PORTABLE (electric)	34,325,000	74.6
15,639,000	34.0	HEATING PADS	30,361,000	66.0
10,140,000	22.0	HOTPLATES	35,860,000	78.0
4,217,700	9.2	IRONERS	41,782,300	90.8
41,536,500	90.3	IRONS (standard)	4,463,500	9.7
16,655,000	36.2	STEAM IRONS	29,345,000	63.8
17,467,000	38.0	MIXERS	28,533,000	62.0
46,700,000	97.0	**RADIO	1,458,600	3.0
12,965,000	28.2	RANGES	33,035,000	71.8
43,300,000	94.1	REFRIGERATORS	2,700,000	5.9
4,571,000	9.9	ROASTERS	41,429,000	90.1

450,000	1.0	DEHUMIDIFIERS		
1,838,000	4.0	DISHWASHERS	44,162,000	96.0
4,213,000	9.2	*DRYERS, CLOTHES* (electric and gas)	41,787,000	90.8
2,553,000	5.6	FOOD WASTE DISPOSERS	43,447,000	94.4
7,715,000	16.8	FREEZERS	38,285,000	83.2
11,675,000	25.4	HEATERS, PORTABLE (electric)	34,325,000	74.6
15,639,000	34.0	HEATING PADS	30,361,000	66.0
10,140,000	22.0	HOTPLATES	35,860,000	78.0
4,217,700	9.2	IRONERS	41,782,300	90.8
41,536,500	90.3	IRONS (standard)	4,463,500	9.7
16,655,000	36.2	STEAM IRONS	29,345,000	63.8
17,467,000	38.0	MIXERS	28,533,000	62.0
46,700,000	97.0	**RADIO	1,458,600	3.0
12,965,000	28.2	RANGES	33,035,000	71.8
43,300,000	94.1	REFRIGERATORS	2,700,000	5.9
4,571,000	9.9	ROASTERS	41,429,000	90.1
15,410,000	33.5	SANDWICH-WAFFLER (combinations)	30,590,000	66.5
19,834,000	43.1	SHAVERS	26,166,000	56.9
35,000,000	76.1	*TELEVISION	11,000,000	23.9
34,391,000	74.8	TOASTERS	11,609,000	25.2
29,586,000	64.3	VACUUM CLEANERS	16,414,000	35.7
38,700,000	84.1	WASHERS, ELECTRIC	7,300,000	15.9
7,500,000	16.3	WATER HEATERS	38,500,000	83.7

* Bureau of Census, June 1955.

** Projected from Politz Survey, Jan. 1955

10 Year Sales and Retail Value of APPLIANCES, RADIO and TEL

PRODUCT	1946		1947		1948		1949		1950		1951		1952	
	NUMBER SOLD	RETAIL VALUE	NUMBER SOLD	RETAIL VALUE	NUMBER SOLD	RETAIL VALUE	NUMBER SOLD	RETAIL VALUE	NUMBER SOLD	RETAIL VALUE	NUMBER SOLD	RETAIL VALUE	NUMBER SOLD	
Air Conditioners, Room	29,840	$10,298,000	42,900	$17,421,000	73,630	$27,198,000	89,320	$31,473,700	200,900	$62,646,000	237,500	$80,393,000	380,400	$129
Bed Coverings, Electric	200,000	$8,000,000	630,000	26,460,000	675,000	29,025,000	440,000	16,500,000	800,000	31,600,000	776,000	32,980,000	830,000	35
Blankets					215,000	8,170,000	175,000	6,562,500	225,000	8,437,500	290,000	11,455,000	395,000	16
Broilers	800,000	9,800,000	255,000	3,442,500	280,000	5,026,000	260,000	4,667,000	295,000	7,360,000	312,000	7,200,000	434,700	13
Cleaners, Vacuum:														
Floor Type **	2,289,500	155,228,100	3,801,000	285,368,000	3,360,800	257,542,700	2,889,500	221,794,300	3,529,400	280,305,000	2,729,100	234,893,600	2,841,800	260
Hand Type	80,000	1,505,880	186,400	4,827,000	289,900	7,706,400	191,000	5,355,100	230,300	6,614,200	176,000	5,313,500	155,000	4
Clocks	6,500,000	40,950,000	9,729,000	69,076,000	9,995,000	74,962,500	5,280,000	33,200,000	8,100,000	54,000,000	7,500,000	52,125,000	6,700,000	48
Coffee Makers: Total	5,000,000	43,150,000	2,963,000	29,516,000	2,700,000	33,870,000	2,450,000	39,300,000	2,975,000	54,101,250	2,825,000	59,409,750	3,000,000	60
Automatic			200,000	4,000,000	600,000	12,000,000	800,000		900,000	25,155,000	1,695,000	43,646,250	1,950,000	48
Non-Automatic			2,763,000	25,516,000	2,100,000	21,870,000	1,650,000		2,075,000	28,946,250	1,130,000	15,763,500	1,050,000	11
Dehumidifiers							25,000		45,000	6,300,000	55,240	7,678,400	87,450	12
Dishwashers, Motor-Driven			120,000	30,000,000	225,000	61,875,000	160,000	44,000,000	230,000	66,700,000	260,000	78,000,000	175,000	52
Dryers, Clothes, Total			58,000	12,180,000	92,000	20,720,000	105,700	24,317,200	318,500	70,449,400	492,000	120,679,500	634,850	162
Electric			38,000		76,700		84,560		250,980	53,378,400	354,000	82,039,500	473,900	116
Gas			20,000		15,300		21,140		67,520	17,071,000	138,000	38,640,000	160,950	46
Fans:														
Attic			125,000	15,625,000	85,000	11,050,000	76,500	9,562,500	95,000	12,302,500	90,000	12,325,500	95,000	14
Desk and Bracket	1,239,450	13,680,000	3,555,000	65,767,500	3,470,000	60,725,000	2,776,000	51,356,000	2,450,000	42,262,500	2,225,000	43,387,500	1,625,000	36
Hassock or Floor									180,000	7,110,000	185,000	8,136,300	265,000	12
Ventilating, Wall & Ceiling	203,080	2,877,000	265,000	9,142,500	240,000	9,000,000	255,000	9,817,500	495,000	17,745,800	444,500	14,404,300	585,000	19
Window Ventilating											320,000	16,640,000	505,000	27
Portable Roll-Abouts														
Floor Polishers			185,000	9,250,000					240,000	13,800,000	275,000	16,500,000	287,000	18
Food Waste Disposers			100,000	12,500,000	175,000	21,000,000	155,000	20,925,000	320,000	43,200,000	352,000	47,520,000	260,000	33
Freezers, Home	210,300	80,000,000	607,000	200,310,000	690,000	220,800,000	485,000	162,475,000	890,000	289,250,000	1,050,000	378,000,000	1,140,000	421
Fryers, Deep Fat									500,000	12,475,000	725,000	20,662,500	1,525,000	45
Frypan—Skillets														
Heaters, Convector & Radiant:	2,000,000	25,000,000	1,850,000	26,825,000	1,300,000	16,900,000	835,000	9,602,500	1,115,000	15,364,700	930,000	12,393,000	1,202,000	31
Fan-Forced & Fan-Heaters											605,000	9,468,000	690,000	12
Non-Fan Forced											325,000	2,925,000	270,000	2
Wall Type													242,000	16
Heating Pads	2,900,000	17,400,000	2,140,000	13,910,000	1,600,000	10,800,000	1,350,000	9,112,500	1,725,000	11,988,750	1,450,000	10,077,500	1,500,000	10
Hotplates	2,000,000	11,560,000	1,453,000	13,803,500	1,225,000	10,964,000	820,000	6,519,000	1,160,000	9,454,000	940,000	8,695,000	905,000	8
Ironers	175,000	13,146,000	599,300	75,821,800	477,000	71,550,000	307,350	43,028,300	409,200	59,465,900	283,840	49,572,700	211,400	44
Irons: Total	9,600,000	82,959,000	11,004,000	121,215,000	7,360,000	94,392,500	6,310,000	81,639,500	7,475,000	101,188,500	7,585,000	104,166,800	6,235,000	97
Automatic	7,000,000	67,645,000	8,495,000	93,645,000	5,850,000	75,757,500	4,850,000	62,807,500	5,235,000	67,793,250	4,950,000	60,637,500	2,795,000	36
Non-Automatic / Travel	2,600,000	15,314,000	1,353,000	8,118,000	700,000	4,865,000	495,000	3,440,250	595,000	3,867,500	236,400 / 298,600	1,046,900 / 2,687,400	210,000 / 375,000	3
Steam			1,156,000	19,652,000	810,000	13,770,000	965,000	15,391,750	1,645,000	29,527,750	2,100,000	39,795,000	2,855,000	56
Kitchen Cabinets, Steel †	1,347,500	60,000,000	2,790,000	104,600,000	3,236,400	124,776,700	2,132,000	83,852,800	2,969,000	125,848,300	2,672,100	119,930,900	2,970,000	154
Lamp Bulbs & Tubes: Total	1,304,545,000	285,405,000	1,705,044,000	392,077,000	1,837,294,000	406,605,000	1,756,665,000	389,980,000	2,006,880,000	466,400,000	2,012,132,000	518,100,000	1,849,994,000	484
Fluorescent	50,573,000	48,818,000	79,073,000	79,524,000	79,400,000	80,059,000	72,068,000	72,700,000	88,439,000	95,500,000	86,652,000	102,600,000	77,629,000	93
Large Incandescent	726,105,000	149,287,000	831,241,000	174,477,000	845,083,000	179,411,000	814,401,000	173,000,000	933,523,000	204,600,000	950,408,000	228,000,000	920,825,000	222
Photo	43,049,000	7,202,000	78,791,000	13,702,000	143,602,000	24,125,000	155,066,000	26,080,000	229,230,000	37,400,000	295,848,000	51,000,000	341,820,000	58
Miniature (incl. "L")	329,271,000	70,143,000	444,911,000	102,773,000	390,546,000	87,908,000	330,102,000	80,600,000	467,728,000	98,500,000	415,624,000	107,500,000	359,320,000	94
Christmas Tree	155,547,000	9,955,000	271,028,000	21,601,000	378,663,000	35,102,000	385,028,000	37,700,000	287,960,000	30,400,000	263,600,000	29,000,000	150,400,000	16
Lawn Mowers, Power	139,000	17,000,000	362,000	54,000,000	397,000	57,000,000	529,000	65,000,000	1,080,000	100,000,000	1,241,000	121,000,000	1,155,000	110
Mixers, Food:														
Standard	1,500,000	47,265,000	1,220,000	43,310,000	1,550,000	58,105,000	1,375,000	51,562,500	1,700,000	67,150,000	1,475,000	65,687,500	1,375,000	60
Portable					20,000	339,000	150,000	2,542,500	145,000	2,602,750	125,000	2,312,500	455,000	8
Oil Space Heaters †	1,006,200	69,778,200	2,004,200	165,079,970	1,234,900	103,305,100	741,500	60,064 000	886,400	73,480,000	768,490	69,933,000	740,300	68
Radio:														
Home Radios	14,031,000	701,550,000	14,082,700	815,388,300	9,630,300	563,370,600	5,961,200	274,215,200	8,174,600	382,653,000	5,974,300	204,619,800	4,043,100	136
Portable Radios			2,458,300	86,778,000	2,629,600	77,573,200	1,843,400	55,309,800	1,674,700	50,994,600	1,332,990	41,322,700	1,719,900	59
Clock Radios											777,000	30,691,500	1,929,000	65
Ranges	576,700	107,266,200	1,210,000	278,300,000	1,600,000	376,000,000	1,056,000	242,880,000	1,830,000	424,623,000	1,400,000	350,000,000	1,060,000	270
Refrigerators	2,100,000	434,700,000	3,400,000	867,000,000	4,766,000	1,239,160,000	4,450,000	1,134,750,000	6,200,000	1,602,266,000	4,075,000	1,120,625,000	3,570,000	1,017
Roasters	150,000	4,500,000	410,000	15,375,000	675,000	25,312,500	350,000	13,125,000	400,000	15,580,000	442,000	18,541,900	425,000	17
Shavers	2,115,000	35,955,000	2,500,000	43,750,000	1,650,000	32,175,000	1,725,000	37,087,500	2,150,000	50,525,000	2,200,000	53,900,000	2,750,000	68

											38,640,000		160,950	46,675
...ttic			125,000	15,625,000	85,000	11,050,000	76,500	9,562,500	95,000	12,302,500	90,000	12,325,500	95,000	14,250,0
Desk and Bracket	1,239,450	13,680,000	3,555,000	65,767,500	3,470,000	60,725,000	2,776,000	51,356,000	2,450,000	42,262,500	2,225,000	43,387,500	1,625,000	36,031,5
...ancock or Floor									180,000	7,110,000	185,000	8,136,300	265,000	12,852,50
Ventilating, Wall & Ceiling	203,080	2,877,000	265,000	9,142,500	240,000	9,000,000	255,000	9,817,500	495,000	17,745,800	444,500	14,404,300	585,000	19,012,50
...Window Ventilating											320,000	16,640,000	505,000	27,750,0
...Portable Roll-Abouts														
...or Polishers			185,000	9,250,000					240,000	13,800,000	275,000	16,500,000	287,000	18,655,0
...d Waste Disposers			100,000	12,500,000	175,000	21,000,000	155,000	20,925,000	320,000	43,200,000	352,000	47,520,000	260,000	33,800,0
...ssers, Home	210,300	80,000,000	607,000	200,310,000	690,000	220,800,000	485,000	162,475,000	890,000	289,250,000	1,050,000	378,000,000	1,140,000	421,800,0
...ers, Deep Fat									500,000	12,475,000	725,000	20,662,500	1,525,000	45,673,0
...pan—Skillets														
...ters, Convector & Radiant	2,000,000	25,000,000	1,850,000	26,825,000	1,300,000	16,900,000	835,000	9,602,500	1,115,000	15,364,700	930,000	12,393,000	1,202,000	31,203,0
...an-Forced & Fan-Heaters											605,000	9,468,000	690,000	12,075,0
...Non-Fan Forced											325,000	2,925,000	270,000	2,430,0
...Wall Type													242,000	16,698,0
...ating Pads	2,900,000	17,400,000	2,140,000	13,910,000	1,600,000	10,800,000	1,350,000	9,112,500	1,725,000	11,988,750	1,450,000	10,077,500	1,500,000	10,425,0
...tplates	2,000,000	11,560,000	1,453,000	13,803,500	1,225,000	10,964,000	820,000	6,519,000	1,160,000	9,454,000	940,000	8,695,000	905,000	8,597,5
...oners	175,000	13,146,000	599,300	75,821,800	477,000	71,550,000	307,350	43,028,300	409,200	59,465,900	283,840	49,572,700	211,400	44,182,6
...ons: Total	9,600,000	82,959,000	11,004,000	121,215,000	7,360,000	94,392,500	6,310,000	81,639,500	7,475,000	101,188,500	7,585,000	104,166,800	6,235,000	97,384,0
...Automatic	7,000,000	67,645,000	8,495,000	93,645,000	5,850,000	75,757,500	4,850,000	62,807,500	5,235,000	67,793,250	4,950,000	60,637,500	2,795,000	36,195,2
...Non-Automatic	2,600,000	15,314,000	1,353,000	8,118,000	700,000	4,865,000	495,000	3,440,250	595,000	3,867,500	236,400	1,046,900	210,000	875,2
...Travel											298,600	2,687,400	375,000	3,356,2
...steam			1,156,000	19,652,000	810,000	13,770,000	965,000	15,391,750	1,645,000	29,527,750	2,100,000	39,795,000	2,855,000	56,957,2
...itchen Cabinets, Steel †	1,347,500	60,000,000	2,790,000	104,600,000	3,236,400	124,776,700	2,132,000	83,852,800	2,969,000	125,848,300	2,672,100	119,930,900	2,970,000	154,000,0
...mp Bulbs & Tubes: Total	1,304,545,000	285,405,000	1,705,044,000	392,077,000	1,837,294,000	406,605,000	1,756,665,000	389,980,000	2,006,880,000	466,400,000	2,012,132,000	518,100,000	1,849,994,000	484,100,0
...Fluorescent	50,573,000	48,818,000	79,073,000	79,524,000	79,400,000	80,059,000	72,068,000	72,700,000	88,439,000	95,500,000	86,652,000	102,600,000	77,629,000	93,000,0
...Large Incandescent	726,105,000	149,287,000	831,241,000	174,477,000	845,083,000	179,411,000	814,401,000	173,000,000	933,523,000	204,600,000	950,408,000	228,000,000	920,825,000	222,000,0
...Photo	43,049,000	7,202,000	78,791,000	13,702,000	143,602,000	24,125,000	155,066,000	26,080,000	229,230,000	37,400,000	295,848,000	51,000,000	341,820,000	58,200,0
...Miniature (incl. "L")	329,271,000	70,143,000	444,911,000	102,773,000	390,546,000	87,908,000	330,102,000	80,600,000	467,728,000	98,500,000	415,624,000	107,500,000	359,320,000	94,800,0
...Christmas Tree	155,547,000	9,955,000	271,028,000	21,601,000	378,663,000	35,102,000	385,028,000	37,700,000	287,960,000	30,400,000	263,600,000	29,000,000	150,400,000	16,100,0
...wn Mowers, Power	139,000	17,000,000	362,000	54,000,000	397,000	57,000,000	529,000	65,000,000	1,080,000	100,000,000	1,241,000	121,000,000	1,155,000	110,000,0
...xers, Food:														
...Standard	1,500,000	47,265,000	1,220,000	43,310,000	1,550,000	58,105,000	1,375,000	51,562,500	1,700,000	67,150,000	1,475,000	65,687,500	1,375,000	60,500,0
...Portable					20,000	339,000	150,000	2,542,500	145,000	2,602,750	125,000	2,312,500	455,000	8,622,2
...l Space Heaters #	1,006,200	69,778,200	2,004,200	165,079,970	1,234,900	103,305,100	741,500	60,064,000	886,400	73,480,000	768,490	69,933,000	740,300	68,852,0
...dio:														
...Home Radios	14,031,000	701,550,000	14,082,700	815,388,300	9,630,300	563,370,600	5,961,200	274,215,200	8,174,600	382,653,000	5,974,300	204,619,800	4,043,100	136,454,6
...Portable Radios			2,458,300	86,778,000	2,629,600	77,573,200	1,843,400	55,209,800	1,674,700	50,994,600	1,332,990	41,322,700	1,719,900	59,336,5
...Clock Radios											777,000	30,691,500	1,929,000	65,586,0
...nges	576,700	107,266,200	1,210,000	278,300,000	1,600,000	376,000,000	1,056,000	242,880,000	1,830,000	424,623,000	1,400,000	350,000,000	1,060,000	270,300,0
...frigerators	2,100,000	434,700,000	3,400,000	867,000,000	4,766,000	1,239,160,000	4,450,000	1,134,750,000	6,200,000	1,602,266,000	4,075,000	1,120,625,000	3,570,000	1,017,450,0
...asters	150,000	4,500,000	410,000	15,375,000	675,000	25,312,500	350,000	13,125,000	400,000	15,580,000	442,000	18,541,900	425,000	17,850,0
...avers	2,115,000	35,955,000	2,500,000	43,750,000	1,650,000	32,175,000	1,725,000	37,087,500	2,150,000	50,525,000	2,200,000	53,900,000	2,750,000	68,612,5
...levision	6,500	2,100,000	178,570	83,500,000	975,000	383,500,000	3,000,000	970,000,000	7,463,800	2,235,408,000	5,384,800	1,572,362,000	6,096,300	1,719,156,6
...sters: Total	3,500,000	41,489,000	5,019,000	62,015,000	4,850,000	78,315,000	4,200,000	73,290,000	4,525,000	80,142,700	3,725,000	75,763,700	2,975,000	59,727,7
...Automatic	1,400,000	26,138,000	2,840,000	51,120,000	3,650,000	71,175,000	3,450,000	68,827,500	3,795,000	76,127,700	3,350,000	73,532,500	2,650,000	58,167,5
...Non-Automatic	2,100,000	15,351,000	2,179,000	10,895,000	1,200,000	7,140,000	750,000	4,462,500	730,000	4,015,000	375,000	2,231,200	325,000	1,560,2
...ffle Irons—Sand. Grills	3,600,000	45,529,000	3,567,000	50,537,500	3,670,000	53,114,000	1,960,000	30,205,000	2,535,000	42,968,250	1,875,000	33,656,300	1,456,000	29,848,0
...shing Machines:														
...Automatic & Semi-Automatic	356,000	106,800,000	962,000	278,980,000	950,000	272,935,000	928,000	236,640,000	1,646,380	423,119,700	1,589,400	445,667,800	1,684,100	471,076,4
...Wringer & Spinner	1,691,380	140,503,000	2,695,000	262,256,000	3,245,600	453,469,400	2,137,000	288,548,000	2,626,200	361,443,900	1,795,300	269,995,200	1,582,400	237,818,9
...ater Heaters, Storage	488,000	58,560,000	1,100,000	143,000,000	1,040,000	137,800,000	695,000	90,350,000	990,000	131,175,000	845,000	114,075,000	720,000	95,040,0
...ater Systems	625,700	57,083,650	730,000	84,000,000	650,000	89,050,000	600,000	78,900,000	723,000	112,065,000	625,000	96,875,000	682,000	110,484,0

.670,

** Vacuum cleaner figures, include new and manufacturers' reconditioned models for prewar, but from 1946 on represent new models only. † So-called portable metal cabinets not included. # Oil space heaters based on Dept. of Commerce figures. Radio, T-V figures since 1947 represent production, estimated by RETMA. 1952-4 Air Conditioner Unit Figures from A.R.I.

All other figures compiled from reports of associations and manufacturers executives and manufacturers, from "Facts for Industry."

PLIANCES, RADIO and TELEVISION

Manufacturers' Sales Including Exports
In Units and Retail Dollar Value

1950		1951		1952		1953		1954		1955		
ETAIL ALUE	NUMBER SOLD	RETAIL VALUE	NUMBER SOLD	RETAIL VALUE	NUMBER SOLD	RETAIL VALUE	NUMBER SOLD	RETAIL VALUE	NUMBER SOLD	RETAIL VALUE	NUMBER SOLD	RETAIL VALUE	PRODUCT
4,700	200,900	$62,646,000	237,500	$80,393,000	380,400	$129,703,000	1,044,700	349,514,000	1,230,000	$419,298,000	1,290,000	$412,800,000	Air Conditioners, Room
00,000	800,000	31,600,000	776,000	32,980,000	830,000	35,275,000	948,000	35,976,000	1,050,000	37,747,500	1,350,000	40,500,000	Rod Coverings, Electric
2,500	225,000	8,437,500	290,000	11,455,000	395,000	16,392,500	310,000	12,384,500	296,000	11,825,000	405,000	14,415,000	Blankets
7,000	295,000	7,360,000	312,000	7,200,000	434,700	13,172,100	1,130,000	56,333,000	1,550,000	75,950,000	1,545,000	77,172,700	Broilers
													Clippers, Vacuum:
4,300	3,529,400	280,305,000	2,729,100	234,893,600	2,841,800	260,081,500	2,777,700	263,121,700	2,658,100	254,459,900	3,330,000	292,806,900	Floor Type **
5,100	230,300	6,614,200	176,000	5,313,500	155,000	4,786,800	173,200	5,212,100	133,600	4,145,600	110,000	3,426,500	Hand Type
00,000	8,100,000	54,000,000	7,500,000	52,125,000	6,700,000	48,575,000	7,625,000	52,993,700	6,900,000	47,955,000	7,200,000	50,040,000	Clocks
00,000	2,975,000	54,101,250	2,825,000	59,409,750	3,000,000	60,185,500	3,685,000	73,515,800	3,450,000	68,674,500	3,675,000	71,662,500	Coffee Makers: Total
	900,000	25,155,000	1,695,000	43,646,250	1,950,000	48,652,500	.....	.....	3,450,000	68,674,500	3,675,000	71,662,500	Automatic
	2,075,000	28,946,250	1,130,000	15,763,500	1,050,000	11,533,000	.....	.....	.....	.....	.....	.....	Non-Automatic
	45,000	6,300,000	55,240	7,678,400	87,450	12,505,300	90,550	12,224,000	76,000	10,260,000	92,000	11,914,000	Dehumidifiers
00,000	230,000	66,700,000	260,000	78,000,000	175,000	52,500,000	180,000	54,000,000	215,000	64,500,000	295,000	90,270,000	Dishwashers, Motor-Driven
7,200	318,500	70,449,400	492,000	120,679,500	634,850	162,781,000	736,700	179,847,000	940,900	215,630,500	1,450,500	319,197,600	Dryers, Clothes, Total
	250,980	53,378,400	354,000	82,039,500	473,900	116,105,500	568,500	134,342,200	697,700	153,040,500	1,085,500	228,356,600	Electric
	67,520	17,071,000	138,000	38,640,000	160,950	46,675,500	168,200	45,504,800	243,200	62,590,000	365,000	90,841,000	Gas
													Fans:
2,500	95,000	12,302,500	90,000	12,325,500	95,000	14,250,000	135,000	18,562,500	125,000	16,375,000	140,000	17,500,000	Attic
6,000	2,450,000	42,262,500	2,225,000	43,387,500	1,625,000	36,031,500	3,035,000	74,357,700	3,825,000	94,286,000	2,525,000	50,373,000	Desk and Bracket
	180,000	7,110,000	185,000	8,136,300	265,000	12,852,500	335,000	16,029,700	360,000	17,100,000	220,000	10,670,000	Bracket or Floor
7,500	495,000	17,745,800	444,500	14,404,300	585,000	19,012,500	754,000	26,390,000	825,000	30,937,500	860,000	30,100,000	Ventilating, Wall & Ceiling
	.....	.....	320,000	16,640,000	505,000	27,750,000	845,000	52,939,000	1,425,000	79,643,000	1,645,000	82,168,000	Window Ventilating
	.....	.....	.....	.....	.....	.....	110,000	8,250,000	175,000	12,775,000	165,000	12,787,000	Portable Roll-About
	240,000	13,800,000	275,000	16,500,000	287,000	18,655,000	295,000	19,175,000	325,000	19,500,000	375,000	20,250,000	Floor Polishers
5,000	320,000	43,200,000	352,000	47,520,000	260,000	33,800,000	325,000	.....	400,000	47,980,000	520,000	62,374,000	Food Waste Disposers
5,000	890,000	289,250,000	1,050,000	378,000,000	1,140,000	421,800,000	1,090,000	436,000,000	990,000	391,425,000	1,100,000	439,945,000	Freezers, Home
	500,000	12,475,000	725,000	20,662,500	1,525,000	45,673,000	2,650,000	79,500,000	1,995,000	43,690,500	2,275,000	39,812,500	Fryers, Deep Fat
	.....	.....	.....	.....	.....	.....	.....	.....	1,100,000	26,400,000	2,660,000	50,540,000	Fryers—Skillets
2,500	1,115,000	15,364,700	930,000	12,393,000	1,202,000	31,203,000	1,400,000	33,905,300	1,330,000	34,232,500	1,535,000	45,146,000	Heaters, Convector & Radiant:
	.....	.....	605,000	9,468,000	690,000	12,075,000	940,000	17,390,000	850,000	16,787,500	820,000	15,990,000	Fan-Forced & Fan-Heaters
	.....	.....	325,000	2,925,000	270,000	2,430,000	195,000	1,940,300	*180,000	*2,475,000	*185,000	*2,682,500	Non-Fan Forced
	.....	.....	.....	.....	242,000	16,698,000	265,000	14,575,000	300,000	14,970,000	530,000	26,473,500	Wall Type
2,500	1,725,000	11,988,750	1,450,000	10,077,500	1,500,000	10,425,000	1,875,000	12,281,200	1,675,000	10,887,500	1,920,000	11,808,000	Heating Pads
9,000	1,160,000	9,454,000	940,000	8,695,000	905,000	8,597,500	695,000	5,907,500	710,000	5,928,500	720,000	5,580,000	Humidifiers
8,300	409,200	59,465,900	283,840	49,572,700	211,400	44,182,600	160,000	34,013,000	89,840	18,291,000	88,630	18,674,300	Ironers
9,500	7,475,000	101,188,500	7,585,000	104,166,800	6,235,000	97,384,000	7,575,000	118,577,000	6,583,300	95,062,300	8,028,000	114,798,800	Ironers Total
7,500	5,235,000	67,793,250	4,950,000	60,637,500	2,795,000	36,195,250	2,720,000	32,640,000	2,215,000	22,748,000	2,520,000	25,830,000	Automatic
			236,400	1,046,900	210,000	875,250	175,000	691,000	118,300	431,800	113,000	446,300	Non-Automatic
0,250	595,000	3,867,500	298,600	2,687,400	375,000	3,356,250	430,000	4,708,500	400,000	4,700,000	295,000	3,097,500	Travel
1,750	1,645,000	29,527,750	2,100,000	39,795,000	2,855,000	56,957,250	4,250,000	80,537,500	3,850,000	67,182,500	5,100,000	85,425,000	Steam
2,800	2,969,000	125,848,300	2,672,100	119,930,900	2,970,000	154,000,000	3,441,000	178,000,000	3,372,000	174,440,000	4,046,000	209,328,000	Kitchen Cabinets, Steel †
0,000	2,006,880,000	466,400,000	2,012,132,000	518,100,000	1,849,994,000	484,100,000	2,201,159,000	613,500,000	2,244,068,000	641,700,000	2,450,700,000	751,500,000	Lamp Bulbs & Tubes: Total
0,000	88,439,000	95,500,000	86,652,000	102,600,000	77,629,000	93,000,000	84,665,000	121,000,000	86,168,000	131,000,000	95,700,000	152,000,000	Fluorescent
0,000	933,523,000	204,600,000	950,408,000	228,000,000	920,825,000	222,000,000	976,461,000	264,000,000	1,003,600,000	286,000,000	1,025,000,000	330,000,000	Large Incandescent
0,000	229,230,000	37,400,000	295,848,000	51,000,000	341,820,000	58,200,000	485,670,000	83,200,000	454,000,000	73,500,000	500,000,000	78,000,000	Flash
0,000	467,728,000	98,500,000	415,624,000	107,500,000	359,320,000	94,800,000	427,363,000	120,800,000	377,300,000	118,800,000	470,000,000	156,000,000	Miniature (incl. "L")
0,000	287,960,000	30,400,000	263,600,000	29,000,000	150,400,000	16,100,000	227,000,000	24,500,000	323,000,000	32,400,000	360,000,000	35,500,000	Christmas Tree
0,000	1,080,000	100,000,000	1,241,000	121,000,000	1,155,000	110,000,000	1,275,000	144,542,000	1,350,000	121,095,000	2,103,100	180,868,800	Lawn Mowers, Power
													Mixers, Food:
2,500	1,700,000	67,150,000	1,475,000	65,687,500	1,375,000	60,500,000	1,270,000	55,880,000	1,315,000	58,188,700	1,615,000	71,464,000	Standard
2,500	145,000	2,602,750	125,000	2,312,500	455,000	8,622,250	615,000	11,654,200	925,000	18,037,500	1,625,000	31,687,500	Portable
4,000	886,400	73,480,000	768,490	69,933,000	740,300	68,852,000	647,800	60,892,700	452,000	43,394,000	410,000	40,180,000	Oil Space Heaters ‡
													Radios:
5,200	8,174,600	382,653,000	5,974,300	204,619,800	4,043,100	136,454,600	4,403,000	138,694,500	3,067,600	88,193,500	3,525,000	101,343,800	Home Radios
9,800	1,674,700	50,994,600	1,332,990	41,322,700	1,719,900	59,336,500	1,741,600	60,712,000	1,333,500	42,472,000	2,050,000	71,647,500	Portable Radios
	.....	.....	777,000	30,691,500	1,929,000	65,586,000	2,041,100	69,397,400	1,874,900	58,121,900	2,225,000	75,538,700	Clock Radios
0,000	1,830,000	424,623,000	1,400,000	350,000,000	1,060,000	270,300,000	1,250,000	318,750,000	1,350,000	353,700,000	1,600,000	420,800,000	Receiver
0,000	6,200,000	1,602,266,000	4,075,000	1,120,625,000	3,570,000	1,017,450,000	3,650,000	1,076,750,000	3,600,000	1,095,865,000	4,025,000	1,267,875,000	Refrigerators
5,000	400,000	15,580,000	442,000	18,541,900	425,000	17,850,000	395,000	17,380,000	350,000	13,982,500	330,000	13,183,500	Ranges
7,500	2,150,000	50,525,000	2,200,000	53,900,000	2,750,000	68,612,500	3,500,000	94,500,000	3,950,000	108,625,000	4,750,000	121,125,000	Shavers

Television

							100,200	45,504,8
,500	95,000	12,302,500	90,000	12,325,500	95,000	14,250,000	135,000	18,562,5
,000	2,450,000	42,262,500	2,225,000	43,387,500	1,625,000	36,031,500	3,035,000	74,357,7
	180,000	7,110,000	185,000	8,136,300	265,000	12,852,500	335,000	16,029,7
,500	495,000	17,745,800	444,500	14,404,300	585,000	19,012,500	754,000	26,390,0
			320,000	16,640,000	505,000	27,750,000	845,000	32,939,0
							110,000	8,250,0
	240,000	13,800,000	275,000	16,500,000	287,000	18,655,000	295,000	19,175,0
,000	320,000	43,200,000	352,000	47,520,000	260,000	33,800,000	325,000	
,000	890,000	289,250,000	1,050,000	378,000,000	1,140,000	421,800,000	1,090,000	436,000,0
	500,000	12,475,000	725,000	20,662,500	1,525,000	45,673,000	2,650,000	79,500,0
,500	1,115,000	15,364,700	930,000	12,393,000	1,202,000	31,203,000	1,400,000	33,905,3
			605,000	9,468,000	690,000	12,075,000	940,000	17,390,0
			325,000	2,925,000	270,000	2,430,000	195,000	1,940,3
					242,000	16,698,000	265,000	14,575,0
,500	1,725,000	11,988,750	1,450,000	10,077,500	1,500,000	10,425,000	1,875,000	12,281,2
,000	1,160,000	9,454,000	940,000	8,695,000	905,000	8,597,500	695,000	5,907,5
,300	409,200	59,465,900	283,840	49,572,700	211,400	44,182,600	160,000	34,013,0
,500	7,475,000	101,188,500	7,585,000	104,166,800	6,235,000	97,384,000	7,575,000	118,577,0
,500	5,235,000	67,793,250	4,950,000	60,637,500	2,795,000	36,196,250	2,720,000	32,640,0
			236,400	1,046,900	210,000	875,250	175,000	691,0
,250	595,000	3,867,500	298,600	2,687,400	375,000	3,356,250	430,000	4,708,1
,750	1,645,000	29,527,750	2,100,000	39,795,000	2,855,000	56,957,250	4,250,000	80,537,5
,800	2,969,000	125,848,300	2,672,100	119,930,900	2,970,000	154,000,000	3,441,000	178,000,0
,000	2,006,880,000	466,400,000	2,012,132,000	518,100,000	1,849,994,000	484,100,000	2,201,159,000	613,500,0
,000	88,439,000	95,500,000	86,652,000	102,600,000	77,629,000	90,000,000	84,665,000	121,000,0
,000	933,523,000	204,600,000	950,408,000	228,000,000	920,825,000	222,000,000	976,461,000	264,000,0
,000	229,230,000	37,400,000	295,848,000	51,000,000	341,820,000	58,200,000	485,670,000	83,200,0
,000	467,728,000	98,500,000	415,624,000	107,500,000	359,320,000	94,800,000	427,363,000	120,000,0
,000	287,960,000	30,400,000	263,680,000	29,000,000	150,400,000	16,100,000	227,000,000	24,500,0
,000	1,080,000	100,000,000	1,241,000	121,000,000	1,155,000	110,000,000	1,275,000	144,542,0
,500	1,700,000	67,150,000	1,475,000	65,687,500	1,375,000	60,500,000	1,270,000	55,880,0
,500	145,000	2,602,750	125,000	2,312,500	455,000	8,622,250	615,000	11,654,2
4 000	886,400	73,480,000	768,490	69,933,000	740,300	68,852,000	647,300	60,892,7
,200	8,174,600	382,653,000	5,974,300	204,619,800	4,043,100	136,454,600	4,403,000	138,694,5
,800	1,674,700	50,994,600	1,332,990	41,322,700	1,719,900	59,336,500	1,741,600	60,712,0
			777,000	30,691,500	1,929,000	65,586,000	2,041,100	69,397,4
,000	1,830,000	424,623,000	1,400,000	350,000,000	1,060,000	270,300,000	1,250,000	318,750,0
,000	6,200,000	1,602,266,000	4,075,000	1,120,625,000	3,570,000	1,017,450,000	3,650,000	1,076,750,0
,000	400 000	15,580,000	442,000	18,541,900	425,000	17,850,000	395,000	17,380,0
,500	2,150,000	50,525 000	2,200,000	53,900,000	2,750,000	68,612,500	3,500,000	94,500,0
,000	7,463,800	2,235,408,000	5,384,800	1,572,362,000	6,096,300	1,719,156,600	7,215,800	2,029,434,0
,000	4,525,000	80,142,700	3,725,000	75,763,700	2,975,000	59,727,700	3,170,000	57,721,0
,500	3,795,000	76,127,700	3,350,000	73,532,500	2,650,000	58,167,500	2,825,000	56,358,0
,500	730,000	4,015,000	375,000	2,231,200	325,000	1,560,200	345,000	1,362,0
,000	2,535,000	42,968,250	1,875,000	33,656,300	1,456,000	29,848,000	1,370,000	29,455,0
,000	1,646,380	423,119,700	1,589,400	445,667,800	1,684,100	471,076,400	2,070,800	577,401,0
,000	2,626,200	361,443,900	1,795,300	269,996,200	1,582,400	237,818,900	1,521,400	228,018,0
,000	990,000	131,175,000	845,000	114,075,000	720,000	95,040,000	780,000	102,960,0
,000	723,000	112,065,000	625,000	96,875,000	682,000	110,484,000	702,050	119,000,0

dio, T-V figures since 1947 represent pro- mit Figures from A.B.I.

All other figures compiled from reports of associations and manufacturers, fr om estimates by ass ciation executives and manufacturers, from "Facts for Industry," and Commerce of Manufactures.

45,504,800	243,200	62,590,000	365,000	90,841,000	Gas
					Fans:
18,562,500	125,000	16,375,000	140,000	17,500,000	Attic
74,357,700	3,825,000	94,286,000	2,525,000	50,373,000	Wall and Bracket
16,029,700	360,000	17,100,000	220,000	10,670,000	Circuit or Floor
36,390,000	825,000	30,937,500	860,000	30,100,000	Ventilating, Wall & Ceiling
52,939,000	1,425,000	79,643,000	1,645,000	82,168,000	Window Ventilating
8,250,000	175,000	12,775,000	165,000	12,787,000	Portable Hill-Abouts
19,175,000	325,000	19,500,000	375,000	20,250,000	Floor Polishers
	400,000	47,900,000	520,000	62,374,000	Food Waste Disposers
46,000,000	990,000	391,425,000	1,100,000	439,945,000	Freezers, Home
79,500,000	1,995,000	43,690,500	2,275,000	39,812,500	Fryers, Deep Fat
	1,100,000	26,400,000	2,660,000	50,540,000	Frypan—Skillets
33,905,300	1,330,000	34,232,500	1,535,000	45,146,000	Heaters, Convector & Radiant:
17,390,000	850,000	16,787,500	820,000	15,990,000	Fan-Forced & Fan-Heaters
1,940,300	*180,000	*2,475,000	*185,000	*2,682,500	Non-Fan Forced
4,575,000	300,000	14,970,000	530,000	26,473,500	Wall Type
2,281,200	1,675,000	10,887,500	1,920,000	11,808,000	Heating Pads
5,907,500	710,000	5,928,500	720,000	5,580,000	Hotplates
14,013,000	89,860	18,291,000	88,630	18,674,300	Ironers
8,577,000	6,583,300	95,062,300	8,028,000	114,798,800	Irons: Total
2,640,000	2,215,000	22,748,000	2,520,000	25,830,000	Automatic
691,000	118,300	631,800	113,000	446,300	Non-Automatic
4,708,500	400,000	4,700,000	295,000	3,097,500	Travel
0,537,500	3,850,000	67,182,500	5,100,000	85,425,000	Steam
8,000,000	3,372,000	174,440,000	4,046,000	209,328,000	Kitchens Cabinets, Steel †
3,500,000	2,244,068,000	641,700,000	2,450,700,000	751,500,000	Lamps Bulbs & Tubes: Total
1,000,000	86,168,000	131,000,000	95,700,000	152,000,000	Fluorescent
4,000,000	1,003,600,000	286,000,000	1,025,000,000	330,000,000	Lamp Replacement
3,200,000	454,000,000	73,500,000	500,000,000	78,000,000	Flash
0,000,000	377,200,000	118,800,000	470,000,000	156,000,000	Miniature (incl. "G")
3,500,000	323,000,000	32,400,000	360,000,000	35,500,000	Christmas Tree
3,542,000	1,350,000	121,095,000	2,103,100	100,868,000	Lawn Mowers, Power
5,880,000	1,315,000	58,188,700	1,615,000	71,464,000	Mixers, Food:
1,654,200	925,000	18,037,500	1,625,000	31,687,500	Standard
					Portable
0,892,700	452,000	43,394,000	410,000	40,180,000	Oil Space Heaters #
4,694,500	3,067,600	88,193,500	3,525,000	101,343,800	Radios
2,712,000	1,333,500	42,472,000	2,050,000	71,647,500	Home Radios
3,397,400	1,874,900	58,121,900	2,225,000	75,538,700	Portable Radios
1,750,000	1,350,000	353,700,000	1,600,000	420,800,000	Clock Radios
1,750,000	3,600,000	1,095,865,000	4,025,000	1,267,875,000	Ranges
3,880,000	350,000	13,982,500	330,000	13,183,500	Refrigerators
					Washers
1,800,000	3,950,000	108,625,000	4,750,000	121,125,000	Shavers
7,436,000	7,346,700	1,689,741,000	7,905,000	1,833,960,000	Televisions
3,721,500	3,110,000	52,226,600	3,350,000	56,318,000	Receivers: Total
3,358,800	2,690,000	50,975,000	3,035,000	55,388,000	Automatic
1,362,700	420,000	1,251,600	315,000	930,000	Non-Automatic
1,455,000	928,000	17,354,000	995,000	18,905,000	Waffle Irons—Grids, Grills
					Washing Machines:
7,401,100	2,401,000	653,816,300	3,187,000	856,793,100	Automatic & Semi-Automatic
1,018,200	1,209,400	179,741,000	1,200,400	175,654,500	Wringer & Spinner
1,960,000	800,000	101,337,500	900,000	107,955,000	Water Heaters, Storage
1,000,000	728,000	123,600,000	788,000	130,000,000	Water Softeners

Lamps and Bulbs do not include exports. * 1964-5 non-fan heaters include glow radiant portable.

Permission to reprint, or use in general provided credit is given ELECTRICAL MERCHANDISING.

Page of Transcript

Q. And have the sales of the VS 700 series been comparable since that time with the figures you have just mentioned?

A. We are producing substantial quantities of the VS 700 series engines.

Q. Let's take the period including 1952, '53, and '54, could you give us a general idea as to the probable number of vertical shaft 700 series engines manufactured and sold by Clinton during that period.

252 A. The total for that period would be nearly a half a million units.

The relation between the horizontal shaft 700 series engine and the vertical shaft 700 series engine as it was introduced in 1949, was that the first VS 700 series engine was fashioned from the majority of the parts of the horizontal 700 series engine for the R.P.M. Manufacturing Company, then located in Lamar, Missouri, and who were at that time a supplier for Sears Roebuck and Company. There were internal changes within the engine necessary to accomplish the vertical shaft application
253 which basically dealt with the lubrication system. The main castings were substantially the same, or were the same with the exception of minor drilling deviation. In
255 adapting that main casting for use in a vertical shaft engine, the cover Exhibit D-105 was a substitute for one of the bases that were used on the horizontal series 700 engine.

257 I am familiar with the two-cycle engine manufactured and sold by Clinton, model designation VS 200 series. We introduced that in the latter part of 1952. The reason for our bringing out a VS 200 series engine was for the purpose of supplying to our customers a die-cast low-cost

Page of Transcript

light weight vertical shaft engine and to accommodate the tremendous demand and change taking place in the power lawnmower business. The VS 200 series was a die-cast engine. That engine was produced and sold in substantial quantities in 1952 and 1953, and thereafter. Clinton is still manufacturing and selling that engine. And the quantities of that engine now being sold are very
258 substantial. That engine primarily was used on rotary lawnmowers. Exhibit D-106, being a VS 200 series engine, can be adapted to a power lawnmower deck by the four drilled and tapped mounting holes which are located within a four inch bolt circle. The Exhibit D-107
259 adapter plate is used in conjunction with Exhibit D-106 in this particular fashion, whereby the four mounting holes in the interior of the plate align with the four mounting holes of the Exhibit D-106. It also can be inverted in the opposite fashion by the changing of the muffler and the four center holes aligned with the same four base holes on Exhibit D-106. The adapter plate D-107 has a similar function to the adapter plates that were used in connection with the VS 700 engine. In the normal disposition of the VS 200 engine the adapter plate would be on the bottom with the engine above it.

* * * *

266 *Cross Examination*

* * * *

269 I first learned of the Lauson vertical shaft power head engine probably in 1946 or 1947.

---

272 CLARENCE P. DAMON (RECALLED)

273 *Direct Examination*

Defendant's Exhibit D-10 is the die-cast cylinder block for the light weight engine Clinton VS 100. The block

Page of Transcript

is not complete in that the bronze or steel backed bronze bearing or solid bronze insert that is used in the upper main bearing is not in the block. And it needs to have a portion of the breather baffle assembled. The cylinder in defendant's Exhibit D-10 is formed by a cast-iron cylinder liner cast into the aluminum block. And this cast liner forms the bore of the cylinder in which the
274 piston operates.

Defendant's Exhibit D-111 is the cylinder liner which is used in casting our cylinder — or I should say, it is placed in the die-casting machine to be cast into the aluminum casting. And the surface of this casting, which is identified as D-111, has a rough practically threaded surface with two undercut rings which each serve a function. The rings are to eliminate the possibility of the sleeve becoming loose in the aluminum casting because of the difference in the expansion of the aluminum and the cast-iron, and the rough surface tends to give more heat-dissipating effect to this liner and getting the heat from the liner to the fins for cooling the cylinder. Defendant's Exhibit D-112 is the raw casting of which liner D-111 is made. That is as it comes from the foundry. D-111 and D-112 are close-grained cast-iron.

275 Q. What operation is performed on a liner casting such as Exhibit D-112, to produce a liner such as D-111?

A. Well, after the part is turned over from the foundry to the machine shop there is a turning of the OD and a boring of the ID. By OD I mean outside diameter—giving the grooves and the threaded surface to give the dimensions insuring the thickness of the wall of the cylinder. ID or inside diameter is bored with a certain surface finish specified and a definite tolerance, so that

Page of Transcript

the sleeve, which is identified as D-111, will fit the core in the die-casting die required to complete the cylinder.

All of Clinton's light weight four-cycle engines use a liner such as Exhibit D-111. In order to complete the
276 cylinder and crankcase for the Clinton four-cycle engine you would need in addition to the cylinder liner the bearing inserts, the cover which covers the power take-off side, and the cover which closes the valve spring chamber. And in order to have a functional engine you also need
277 the cylinder head.

Clinton uses an aluminum die-cast piston in their light weight engine. That piston is not plated in any way.

Now, if you were to take a completed Clinton light weight engine and remove the liner therefrom—that is, the cylinder liner, that engine would not be operative with
278 the cylinder liner removed. By removing the liner you would open the bore by the clearance of the wall of the liner and there would be a rough surface and I am sure that would be abrasive on the ring.

Mr. Jones: We will admit that, Your Honor.

Q. Now, is there any reason you know of why Clinton employed a cylinder liner in connection with its die-cast engine?

A. Yes. Our engineering department felt that due to the years of testing carried on by the automobile industry, the small gasoline engine industry, and our own testing of aluminum pistons in cast iron cylinders, that it would be to our advantage to remain with an established practice. I should say, an approved practice.

To my knowledge Clinton has not had any particular trouble in connection with the operation of its engines

Page of Transcript

in the inserted cylinder liner in light weight engines — with the operation of the piston in the cylinder liner. If there was any significant difficulty in that connection it is likely I would have heard about it. In the tests I have
279 performed I would have seen it there; I would have heard about it in some manner.

The Court: I am not sure I heard why the liner is preferable to not using the liner.

A. Your Honor, prior to the building of aluminum die-cast engines Clinton Machine Company built a considerable number of cast-iron engines which in the inside of their block had the same surface touching the pistons as would be simulated by installing a cast-iron cylinder liner as exemplified in D-111, and to meet further competition—and their building and developing engines the majority of them were based on aluminum pistons in cast-iron cylinders. Practically all automobiles as they are manufactured and have been manufactured in the past since the advent of aluminum pistons, use a cast-iron cylinder. There are variations from that, but we figure there is enough evidence through our testing and through things established in the field we were satisfied to do with what was available. The performance of a die-cast
280 piston in a cast-iron cylinder liner, as when used in the light weight engine, is identical with that of a die-cast piston operating in a cast-iron cylinder bore as in the VS 700 engine.

281 I think that a die-cast piston would not operate on a die-cast cylinder. You would have two similar metals, and without the addition of something I am afraid it would be inoperative. A cast-iron cylinder with an aluminum piston would run indefinitely for many hours —

it is hard to tell in the particular engine. But a cast-
282 aluminum piston on an aluminum bore is not practiced and it would not be functional, in my estimation. Now, if the piston were chrome-plated in the case where it runs in the die-cast cylinder bore, that immediately changes the picture. The chrome plating to a piston running in a die-cast aluminum bore would give you an operative cylinder and is practiced in the field today. Now, as to the life of the performance of the chrome-plated piston working in the aluminum cylinder, as compared to the aluminum die-cast piston working in a cast-iron bore, my experience has been, and I think it is substantiated by the practice most widely used, that the aluminum piston in the cast-iron bore is superior.

283 The parts required to complete the cylinder and crankcase D-114 would be a cover plate, closing this opening on the power take-off end, a plate closing the tappet case or valve chamber, a pipe plug in both ends to complete the plugging of the base. And to make it an operative cylinder of course a cylinder head would be—

Q. Now, does this block have a cast-iron cylinder insert as is characteristic of Exhibit D-10?

A. Yes, it does.

Q. Is the same cylinder liner used in that block as used in the block for the vertical shaft engine?

A. No, it is not.

284 This particular block has a longer cast iron liner which can be extended down below the cylinder of the casting. And the purpose of this longer liner was two-fold. We used it for a longer stroke engine. This block has a bearing insert in the upper main bearing for the journal of the crankshaft. And that is already in place.

Page of Transcript

Q. Now, would you point out the the differences if any between the horizontal shaft block Exhibit D-114 and the vertical shaft block D-110?

A. By the looks of the blocks I can tell they come from different dies. And one thing that is required in the vertical shaft is a hole drilled through here, across the end here, going to the top main bearing, which will eliminate—. On defendant's Exhibit D-10, which is the
285 cylinder block used for vertical shaft application there is a cross hole drilled from the exterior of the block across the top section of the block underneath the cam shaft boss and into the crankshaft boss, which offers a supply of oil to the top main bearing and to the rotating parts below. That passage is completely unnecessary in the horizontal block D-114. The addition of mounting feet onto the casting D-114 is required when the engine is used as a horizontal. There are no mounting means on the D-10, which is the vertical shaft block. There is another change in the tappet case itself. There is a small hole drilled in the center close to the breather opening on the horizontal block D-114. The purpose of that hole is to drain oil that comes up through the breather. Drain it back into the crankcase proper. The reason this is in that position on the horizontal is that the lowest point is in the center of the casting in the tappet case, and
286 that is where the hole is drilled. And the vertical shaft, which is in this position with the crankshaft extending vertically with the cylinder horizontal, there is a hole drilled back in the bottom of the tappet case at the lowest point possible to provide a hole through here to allow the oil to drain back in, on this particular application. For draining lubricant from the crankcase, on the feet of defendant's Exhibit D-114 there are two holes that

Page of Transcript

communicate from the outside to the crankcase proper. We drill both and tap both and supply a plug for that purpose. The plug being removed will drain the oil from the crankcase. Now, in Exhibit D-10 for the vertical shaft application there are no provisions for draining the oil in this particular casting. As between the vertical shaft light weight and the horizontal shaft light weight,
287 the camshaft in the vertical shaft Clinton engine is considerably longer than the camshaft in the horizontal Clinton engine. Consequently the cam axle is of a different length than the crankshaft used in the vertical shaft applications. I don't recall any specified for horizontal with the same crankshaft.

* * * *

290 Q. How does that bearing and boss construction compare with the bearing and boss in the cover for the Clinton light weight vertical shaft engine?

291 A. Well, I would say it was the same. Moving over to the left, the cam axle boss is observed. And in this engine, as in our light-weight, the cam axle is stationary and the boss takes only the thrust out.

Q. Well, now, how does the boss from the under side—the lower side of the Clinton VS 700, does the boss for the camshaft compare with the boss for the camshaft in the cover which is used on the Clinton vertical shaft light weight engine?

A. It serves the same purpose and is the same.

Q. The same construction?

A. Well, it is cast-iron and the other is aluminum, but it serves the same purpose to the same end, yes, the boss extending up to take the thrust. And in this particular model we press the cam axle into the cylinder block instead of keying as we do in the light weight.

Page of Transcript

Explaining the function of the bosses in the VS 700 engine or plaintiff's Exhibit 19, first, the camshaft boss
292 on the upper side is a part of the sand casting. That projects down into the crankcase. The crankshaft boss is furnished by a bearing plate that closes this opening. That is a separate bearing plate, and serves the same function as the crankshaft boss and the inserted bearing in the light weight engine.

293 Clinton does not employ the same lubrication system in its vertical shaft light weight engine and in its horizontal shaft light weight engine.

It would not be possible to take an operative Clinton vertical shaft engine and remove the lower cover from the
294 crankcase and replace that cover with a cover for a horizontal shaft engine and wind up with a functional engine. In fact you could not even get it on. If I took a horizontal engine, and an operative machine as Clinton machine sells it, take the cover off the horizontal engine and select a vertical shaft cover and attach it to it would I have an operative engine? No. Cover plate Exhibit
296 D-120 is a standard cover plate used in the Clinton VS100 engine, and the parts of this block, Exhibit D-10, the cam gear, the cam axle, and the pump, are VS 100 parts. And I will proceed to assemble this cover to this block assembly. (The witness assembles parts and indicates) In that fashion. I will remove the plate D-120 and endeavor to substitute plate D-119 which is a cover plate for a horizontal 100 engine. (Witness works with parts) And I have an inoperative structure. (Witness indicates) Now, the converse of this —. One thing I
297 would like to point out before I remove the cover is — the gear did not fall out of place or out of mesh with the crankshaft it is simulating that the camshaft would

Page of Transcript

be in. Removing cover D-119 and replacing it with D-120 which is a vertical shaft cover — (Witness exchanges parts) The cam gear is allowed to fall out of place and down below its meshing point with the crank-
298 shaft, because the cover is not so designed to position it in the proper place.

With regard to the vertical shaft engine alone, that is the light weight vertical shaft, Clinton does manufacture a series of interchangeable plates for the vertical shaft engine alone.

Q. Now, is it the practice of Clinton to—after an engine has been manufactured, to change the cover on an engine—on a vertical shaft engine by replacing it with a different cover?

A. Not to my knowledge. It is not the general practice of the Company, I will put it that way.

299 Identifying Exhibit D-123 as a Briggs' horizontal shaft engine and plaintiff's Exhibit 16-A as a Briggs' vertical shaft engine, I note immediately that these large feet on Exhibit D-123 are minus from Exhibit 16-A of plaintiff, and also that there are two bosses extending from the lower section of the crankcase clear to the opening, that are minus in Exhibit D-123. And I notice an entirely different breather system — breather baffle system, I should say, between the two blocks. (Indicates) And I notice a pocket or a cavity in block 16-A that does not appear at all in cylinder block D-123. The
300 cavity in plaintiff's Exhibit 16-A, close to the crankshaft boss, having a hole communicating between it and the crankshaft bearing and to the outside on the opposite side of the opening is for lubricating the upper main bearing in a vertical shaft application. Due to the nature

Page of Transcript

of the lubrication structure, which is a slinger mechanism. the oil is thrown into that pocket and allowed to flow back in through the hole, which is at an angle to the bearing which journals the crankshaft. And it is entirely missing from the horizontal application, which is D-123. Well, there is a drain pocket in this block identified as D-123, and there is no drain pocket or facility for one in plaintiff's Exhibit 16-A. Well, I think that completes the difference.

Briggs & Stratton does not employ in its light weight engines the same kind of lubrication system in its horizontal shaft engine as it does in its vertical shaft engine. In the vertical shaft application they use a nylon gear which runs in connection with the cam gear and has little paddles on the periphery of the gear and throws the oil through the hole to the pocket I indicated in plaintiff's Exhibit D-16-A. And in the horizontal shaft application they use the conventional dip finger or splash
301 system. That includes a part like Exhibit D-122; that is the Clinton part, but it has the same function. The application for distributing the oil in the horizontal engine of Clinton Machine is basically the same as it is in Briggs & Stratton, they are both splash systems with a finger, the same as the one indicated there and the same as the plaintiff uses on his horizontal light weight engine.

Q. I hand you a copy of the Conover patent No. 2,227,247, which is Exhibit D-99, and ask you if you are familiar with the construction disclosed in that patent.

A. Yes, as of recent.

Q. I would like to direct your attention to figure 17 and 18 of that patent and ask you whether as an engineer

Page of Transcript

or a person skilled in the engine art, if you would have any difficulty in completing the construction of the engine there partially shown.

302 A. The engine partially shown in figures 17 and 18 of defendant's Exhibit D-99 is a two-cycle water-cooled engine. It is not complete from what I see, but the basic components are there. And on reading the patent — in reading the patent I should not say that — I am looking at the drawings of the patent D-99 figures 9 and 10. There are parts there shown that would complete the engine into a functional engine, and I can see no major difficulty.

Q. What are the parts that are shown in figures 9 and 10 that would be required to complete the engine shown in figures 18 and 17?

A. Well, the figures 17 and 18 show the piston, the intake ports, the exhaust ports, the closed crankcase, the connecting rod, the crankshaft, the magneto, the cylinder head, the water jacket, and the numberings thereof, plus a shrouding, which is something extra, which is unnecessary to the engine. But the things that are missing are things such as a cylinder head with a sparkplug attached, and a connection between the sparkplug and the magneto. And then a carburetor and a porting means or valve means for allowing this engine to breath in the combustible mixture. Now, in figure 9 parts identified as 118 would transfer the fuel from the carburetor into the cylinder to be compressed in the crankcase and to be ported up through the transfer passage 119, identified
303 on figure 9, and then passed into the cylinder with the piston in the proper position, which is customary in all two-cycle engines. The fuel mixture would pass through opening 121 and be deflected toward the top of the cyl-

Page of Transcript

inder by the deflector on the top of the piston. Then the piston would come up in the operation, and you have the combustible mixture in the cylinder and the spark-plug to ignite it. And there is the magneto shown here, a flywheel magneto, which is a part of most internal combustion engines that operate with a magneto. It could be operated with a battery and coil, but this particular one is an outboard and it has reference to a magneto, or at least it shows a picture of a magneto flywheel. And to further emphasize its magneto there is an advancing mechanism shown on figure 1 just under the flywheel for advancing and retarding the spark, but by no stretch of the imagination can you say it is to eliminate a magneto assembly.

Figures 17 and 18 disclose a construction for a water-cooled engine.

Q. Would you have any difficulty as an engineer in adapting the construction shown in figures 17 and 18 to an air-cooled engine?

A. No, it is very similar to our VS 200. All we would have to do is take the water jacket away and add cooling
304 fins. In this structure application you would have to have a cylinder head, because of the nature of the casting.

* * * *

Q. Now, with reference to the Clinton block for the light weight vertical shaft engine I show you defendant's
306 Exhibit D-113 and ask you to state whether that block is a single casting.

A. It can't be a single casting when I testified to that other casting, the cast-iron D-111, which is a cast-iron liner, and is cast in an entirely different place and manner than is the rest of the block.

Q. I show you a Clinton horizontal shaft block D-114 and ask you whether that block is a single casting.

A. This block is a single casting? No, not only does it have a cylinder liner—a cast-iron cylinder liner, it has the bearing pushed into it, and valve inserts.

The drawing of Hargreaves' patent No. 2,417,195, which issued March 11, 1947, Exhibit No. D-124, discloses electric motors and it shows in figure 4 a flange
307 mounted means for attaching this motor, and the other for a different means of attaching the motor. The difference between that first embodiment I have described and the one shown in figure 2 of the patent is that there is a different end plate attached to the motor to make it adaptable for a different application.

Q. Is the end plate shown in the figure 2 different than that shown in figure 4?

A. Well, that is in the patent somewhere as I recall but as parts of the invention they are interchangeable.

Mr. Jones: I move to strike that. This witness doesn't know about the interchangeability, all he knows is about the drawing.

Q. Will you describe what the drawing discloses?

A. Well, let me look here for a minute and I — well, by what it indicates I would say that is what it was, one is interchangeable with the other.

Interchangeability of an end plate on a motor is an old expedient so far as I know. When this case came
308 up as far as adapting something to a lot of different applications I recall in 1938 when I was maintenance man of Quaker Oats Company in Tecumseh, Michigan, we frequently had conditions where we had electric motors

Page of Transcript

mounted in one fashion and we removed the end plate and mounted them in another fashion. And to confirm my thinking I dug up an old catalog to see if I was still able to find something to prove substantially the same thing I was saying, that was used in the practice in the electric motor business. I am familiar with the fact that covers or end covers can be removed from electric motors and another end substituted, giving you a different mounting means —

Mr. Jones: There is no dispute about that.

309 *Cross Examination*

310 I know there are engines in the field that employ a chrome plated cylinder wall and aluminum pistons. And I know there are engines in the field that chrome plate the piston and use the aluminum cylinder wall. They are really one and the same in performance or operation.

311 Q. Isn't it a fact, in Clinton providing a liner they are doing the same thing I have just outlined with reference to either chrome plating the piston wall or chrome plating the piston, they are providing two different types of metal, one against the other?

A. My answer to that would be, no. My experience has been that in the chrome plating of cylinder walls that in my experience we have to have special processes to hold the alloy. There is a threaded roughening of the surface such as McCullough used in his engine.

Q. Now, isn't it a fact that taking an insert such as Clinton uses to make its cylinder wall, inserting the liner in the casting, then that becomes an integral casting?

312 A. Yes, it does become an integral casting.

Page of Transcript

Q. So, therefore, the Clinton casting, as represented for example in defendant's Exhibit 113, is an integral casting, is it not?

A. Yes, but it is not a single casting.

I don't see how you can cast a cast-iron liner, which is an entirely separate metal, in one function, and in another place attach aluminum to it and call it one casting. The difference is in the metals, the variation in the metals themselves.

* * * *

315 I first learned of the Lauson Power Head engine as in my affidavit. Some time after the decision of the Court there was talk in Maquoketa in our engine plant, when the court — after defining the expiration as being — I don't know the exact wording of it, but the expiration of the —

* * * *

316 The date I have given to you, after the decision is when I first learned of the Power Head application.

Q. Was it discussed in the plant of the Clinton Machine Company?

A. Was it discussed?

Q. Yes, when you learned of the Power Head.

A. Well, I took it rather lightly first, and then looked at it a little and then started to investigate.

Q. You were probably the first one at Clinton to learn of the Power Head?

A. Yes, I was, because I started asking questions. But don't misconstrue that, there might not have been someone there that was working on the case that could have found it, I couldn't say that.

Page of Transcript

The first Sport King engine I ever saw is the one that is here. That was after the decision.

Q. Now, in the VS 700 engine what closes the power take-off side of the crankcase?

* * * *

317 A. The wall of the crankcase.

Q. Now, would the VS 700 engine have been operative without the adapter plates D-87, D-88, D-89, D-91, D-92? * * * Would it run and operate?

* * * *

The Witness:

319 Now, taking the VS 700 engine, you make no changes in that engine to use it on either one of these adapter plates we have just examined. In other words, you could use it on the D-87. You could use it on the D-81 without change. You could use it on the D-89 without change. You could use it on the D-91 and also the D-92 without making any change in the motor.

320 Q. If you want to have a power take-off on a camshaft on the VS 700 engine, could you do so merely by changing an adapter plate?

A. No.

321 Q. Now, when you changed the plate D-103 to one of the other plates it would have to be mounted on the engine in the same place where D-103 is designed to be mounted. Does that in any way change the character of the engine, its operation as an engine?

A. No, it doesn't change it as far as the operation of the engine is concerned.

Q. Now, going back to plate D-103, let's take for example the Exhibit D-104, or any of the other plates we have been generally discussing, could you by changing

Page of Transcript

any of these plates, convert the engine say into a ball-bearing engine as distinguished from the straight bronze bearing?

A. No, you could not.

Q. And could you, by changing one of these plates change the engine to a power take-off on the camshaft as against one that did not have a power take-off on the camshaft?

A. I would hardly think so when it has nothing to do with the camshaft face.

• • • •

323 Q. No matter what changes you may make in the plate, the bottom D-103 or in the adapter plates D-88, D-89, D-91, D-92, no matter what changes you may make in those adapter plates or in this end cover D-103, or any of them like it, it in no wise changes the engine as to for instance changing it from a plain bearing to a ball bearing or from a normal engine with only a power take-off at the crankshaft to one having a power take-off at the camshaft.

A. Well, I think that is really stretching it quite a ways.

Q. Well, you can't do it?

A. Well, no.

324 These adapter plates fit an entirely different side of the engine than that to which the plate D-103 and those like it are secured. Our horizontal shaft engine and our vertical shaft engine casting here in evidence as Exhibits D-110 and D-114, could not have the plate D-120 and D-119 interchangeably secured thereto.

Mr. Jones: May I ask Mr. Lechtenberg to come here please, and demonstrate for me how he did for me,

Page of Transcript

and see if you agree with him. Now, we will take Exhibit D-114 —

Q. Now, we will put the plate D-120 on the casting D-114 with the camshaft therein. Now, would you say that is correctly assembled?

A. No, because we do not sell horizontal blocks with vertical plates, or vice versa.

Q. Would you say that engine will operate that way?

A. Which way are you going to operate it, horizontally? You have got an engine there that has an oil system for one application and not for the other. It is not operative in that condition.

Q. You saw the movie in court the other morning?

A. Yes.

Q. You saw the engines going down the line and by the mere substitution of the slinger for the splasher would change the lubrication system of the engine.

A. That was not the only change — there was different connecting rods used — a different connecting rod used in the vertical shaft application with the holes providing oil for the crankshaft bearing, and no hole in the horizontal application, and other changes.

* * * *

328 Q. Except for the feet the casting used for the vertical shaft engine and the casting used for the horizontal shaft engine is the same except for machining?

A. With the deletion of part of the casting which are the feet — I would say that the Clinton casting was the same as the vertical shaft casting but that the base castings are not the same.

Q. I am not asking you about the base castings, Mr. Damon, I am concerned only with Clinton. Now, please — I believe he said the Clintons were the same with the horizontal or vertical except for the feet.

A. But the feet are a part of the casting.

Q. • • •Now, isn't it a fact that Clinton has built some four-cycle vertical shaft light weight engines with a camshaft power take-off?

A. I have seen the design of that, and I presume that some of them have been built, but I would rather that come from the sales department, as I don't know whether they go out in the field or not.

Q. But engineering-wise you know they have?

A. Yes.

• • • •

Redirect Examination

• • • •

Q. Now, on cross-examination you said that with respect to the Clinton light weight engine that except for mounting feet and except for the machining that was done to the casting, that the castings for the two — that is, the horizontal shaft engine and the vertical shaft engine, were the same, is that what you said?

A. Now, that should probably be qualified a little more, and that is that if it is talking about a raw casting that does not signify any engine, but there are different machining operations that change it and identify it.

Q. Yes, but disregarding the machining required and the amount of the machining —

A. Well, there is a difference in these blocks, in the cylinder liner wall.

Page of Transcript

The cylinder liner in this block D-114, which is the horizontal Clinton engine, is longer than the one in D-113, which is the vertical engine.

Q. Now, in the Clinton light weight engine if you wanted to have a rotary camshaft with the power take-off, would that not require a different camshaft and different bearing arrangement for the camshaft, than otherwise would be necessary?

341 A. Well, it would be necessary to employ a different camshaft. With the camshaft stationary you can't take power off of it if it is standing still. You would need different bearings and a different oil slot, and things of that nature.

342 Q. A die-cast aluminum chrome plated cylinder bore with an aiuminum cast piston running in it on the one hand, and on the other hand you have the construction as used by Clinton in the light weight engine.

A. They are not equivalent construction.

---

343 RUDOLPH L. LOWELL

Direct Examination

Rudolph L. Lowell, Des Moines, Iowa, 47. I am a patent lawyer with offices in Des Moines. I received a BS degree in Mechanical Engineering at the University of Wisconsin in '31. I received my law degree from the same school in '36. I am a member of the Bar of Iowa, Missouri, Wisconsin, and Illinois. And admitted to practice in the Patent Office also. I was employed as 344 an engineer shortly after I graduated as an engineer in '31. That was at the time when you could hardly buy a job. I tried for awhile and went back to school, I could make more money going back to school. I was

ge of
anscript

employed by Fairbanks-Morse and Company at Beloit, Wisconsin, in the experimental department, its diesel engines. I worked on gasoline engines during the summers of 1927 and 1928. That was also for Fairbanks-Morse and Company on what we call their Z engine. After I graduated from law school I went into the patent department of Fairbanks-Morse and Company, first in their patent law office at St. Louis, and later on at their plant in Beloit, Wisconsin; and at that time there was made at that one plant small gasoline engines, magnetos, air-conditioning equipment, centrifugal pumps, reciprocating pumps, two and four-cycle engines. Then I also was in charge of their scale plant. And I left that patent
45 department in 1939 and was employed in the general practice of patent law in Chicago, and my main work was with Motorola equipment, primarily radio, TV, and so on. And I left Chicago in '43 and went to Des Moines, and I have been there ever since. My practice at Des Moines involves litigation, validity opinions, searches, negotiations of contracts, and many times just business counsel — very general.

I have studied the Lechtenberg patent in suit 2,693,789. There is nothing in the specification or in the claims that mentions anything at all about variables and constants.
46 Those terms just don't appear. The horizontal shaft engine shown in figure 2 is described as having a cylinder and a crankcase cast as one piece. It is not the entire cylinder and crankcase cast as one piece. It would be more of the nature structurally speaking as the cylinder. That does not include the cylinder head. In other words it is not the entire body of the engine as described in the patent. The cylinder and crankcase of the engine, as shown in figure 4, is taught as being one casting also,

Page of Transcript

except for the head and the wall which close the power take-off end of the crankcase, with the head being referred to as 6 and the removeable wall as 8.

The patent does not teach the use of the same identical crankcase and cylinder when the engine is used as a
347 horizontal shaft engine, Fig. 2, and when it is used as a vertical shaft engine 4. And referring to column 5 of the patent — "If the engine is intended for operation with its cylinder vertical the crankcase-cylinder casting 3 is provided with integral mounting feet 32 and bosses 33 at opposite sides of the casting, either one of which may be drilled and tapped to provide an oil drain port. But when the engine is intended for operation with its cylinder axis horizontal, the feet and drain port are not needed and hence those portions of the die or mold in which the feet and bosses 33 are formed would be blocked off." Now, there is also one other change that would be made, and that is in the adding to the main casting a bracket 165 for an oil splasher system. That oil splasher is shown in the Lechtenberg patent in Fig. 7, and it is also shown in the assembly in Fig. 4. In figure 7 it has reference as 165. There is a description in the specifica-
348 tion as to the oil splasher — the splasher 165 as shown in Fig. 7, in Column 10 starting with line 61. Other differences between the cylinder crankcase casting of the horizontal shaft engine and a vertical shaft engine, as disclosed by the Lechtenberg patent, are rather minor. They are shown in Fig. 8. An oil hole 164 that is made in a pocket 163 when the engine is used in vertical operation, but that is not described anywhere relative to horizontal operation.

Referring to Fig. 3 of the patent, that item 138 is a cover for what I believe is referred to as a breather as-

sembly 127. And what it does on the casting itself is to just close the air breather vent, if you want to call it that, 122, which is in the upper wall of the casting, and which would open out to the atmosphere except for the breather assembly 127. The cover 138, the breather assembly, would be an essential part of the cylinder-crankcase assembly to make what you would say is an operational engine.

50 Casting the entire engine body in only two parts is not taught in the Lechtenberg patent, and I refer to column 4, line 30, which says: "This main casting —" that will be referring to the casting 3 — "— together with a cylinder head 6, and a crankcase cover casting 7 or 8 (depending upon the intended use of the engine) comprises the entire body of the engine." At column 1, lines 34 to 41, we have the same definition there as to what comprises the body of the engine. That states: "With a view toward taking full advantage of this expedient, the present invention has as its purpose to provide an internal combustion engine of the character described wherein many of the individual component parts of engines as they had been built before are an integral part of either one of two main castings which together with a cylinder head comprise the body of the engine."

51 The cylinder and crankcase in the Clinton VS 100 engine is not a single casting or one casting. It clearly appears on this Exhibit D-113 that the cylinder is provided with a cast-iron liner and also there is a bushing insert for the crankshaft, and plus the fact that also a cover plate for a breather assembly would be required. The patent makes specific exclusion of any kind of a liner for either kind of engine shown in their Fig. 2 or

Fig. 4, and in fact in column 4, beginning with line 75, it states that: "The crankshaft is of conventional construction but the piston 5' though of conventional design and cast of aluminum alloy is distinguished by the fact that it is plated with chromium or some other suitably hard wearing metal. By this expedient it is possible to
352 have both the cylinder and the piston formed of the same basic die casting metal without incurring the cost of lining or plating the cylinder wall, for contrary to previous belief, it has been conclusively demonstrated that the piston rings will not unduly wear a naked, unprotected aluminum alloy cylinder wall. The saving thus effected is substantial since to plate the piston costs but a fraction of what it costs to either plate or line the cylinder wall."

The Lechtenberg patent does state as one of its objects the production of a cheap or less costly engine than those on the market at the time, but the underlying and motivating objective of the invention is to produce an engine which delivers more horsepower per dollar of cost and pound of weight than has heretofore been achieved. Of course that is done by die-casting of aluminum. And there is also mention of other parts going to reduce the cost, such as for example in column 8 beginning with line 15: "The manner in which the breaker arm 91 is mounted exemplifies the extent to which this invention has gone to reduce the cost of an engine and simplify its assembly. As best shown in Figure 14 the breaker arm is stamped from sheet metal — ".

353 In my experience as a patent attorney the practice in the drawing of an application if one intended to include the cast-iron lining as a part of the crankcase-cylinder casting wouldn't be to limit it to either one casting or a single casting or one integral casting. I think it could be

more properly referred to as an integrated casting, or just an integral casting without the limitation of "one" or "single" preceding casting.

Q. Has it been the practice to show the liner also?

The Court: The liner is shown in other patents? Do you know of any shown?

A. Yes, other liners are shown in other patents. It has been the practice, yes.

Claim 6 of the Lechtenberg patent could be considered as representative of the claims here in suit. In my opinion claim 6 would not read on the VS 100 engine.

The chart Exhibit D-125 shows a cylinder and crankcase casting with a portion cut out similar to what is shown here as physical Exhibit D-113. In addition it shows the cover member for closing the open side of the casting. Then there is shown the camshaft assembly C and below that is an unnumbered crankshaft. In other words, this Exhibit D-125 shows the VS 100 engine, or portions of it. Claim 6, after we get by what could be called the preamble, "is characterized by the fact that" reads: "The cylinder and all portions of the crankcase except its bottom wall through which the lower end of the crankshaft passes is one casting." And as previously explained with regard to the physical Exhibit D-113, the crankcase-cylinder assembly of the Clinton VS 100 engine includes a cast-iron cylinder liner. It also includes a bushing for one end of the crankshaft. And also to complete the crankcase it needs a cover here for a breather assembly. When I say here, I am referring to the rectangular opening which is to one side of the cylinder.

Page of Transcript

355 This limitation, namely, that "the cylinder and all portions of the crankcase except the base or bottom wall through which the lower end of the crankshaft passes is one casting," is a limitation in all of the claims. In claim 1 that limitation appears in line 82. That reads, "a single casting," in claim 1. In claim 2, line 15, it calls for "one casting." Claim 4, although not in suit is dependent on claim 2, so that would have the same limitation. In claim 5, line 52 calls for "one casting." In claim 6, in line 9, it calls for "one casting." Claims 7 and 8 are dependent on claim 6. And claim 14, line 39 it calls for "one casting." Claim 15 is dependent on claim 14. And in claim 16, line 81, it calls for "one integral casting."

The claims of the Lechtenberg patent are not limited to a four-stroke cycle engine. Claim 1 is broad enough to read on either a two or four-cycle engine. And other claims, except claims 14 and 15, do call for a single cylinder four-stroke cycle internal combustion engine. But the claims and the specification do not necessarily restrict it to just four-cycle engines, and in that respect the
356 Patent Office applied art that was directed to two-cycle engines. And also in the petition to make special, filed by the applicant Lechtenberg, the petition shows two-cycle engines are also pertinent here. Insofar as cited by the Patent Office and referring to two-cycle engines, the patent of Forster, 2,404,833, the patent of Lutz, 2,606,541, and the patent of Molnar, 2,256,002. Now, with respect to the petition to make special, where the petitioner or applicant Lechtenberg set up certain prior patented art,
357 on that list and as representative of the two-cycle is patent 2,590,134 to Slonneger and 615,766, which is Vansickle.

358 As stated in the patent to Conover No. 2,227,247, Exhibit D-99: "It is the primary object of the present in-

vention to provide novel and improved engine constructions with particular reference to the location and formation of cores, passages and jackets to facilitate the die casting of the engine cylinder and crank case structure." And in all of the constructions illustrated and as set out in the patent on page 4, column 1, line 67: "In each of the several constructions illustrated, the main or principal casting comprises the engine cylinder block and at least a portion of the crank case and is die cast under pressure upon the sleeve-like insert which constitutes the cylinder lining." And the patent here, Conover, is one of the prior art patents where the cylinder liner is illustrated. And in the illustration in the Conover patent from figures 1 through 8, the construction illustrated there shows the top half of a crank case formed as one casting with the cylinders, the bottom half of the crankcase being with what could be called the lower half bearing, and with the division line taking place right on the axis of the crankshaft. Then, in figure 9 there is shown still another
359 structure in which the one casting includes a water jacket, 210, a cylinder wall 220, and a crankshaft bearing 85. Then it has as its closure plates — there are two closure plates shown, this closure plate 87, which is directly opposite the cylinder; then a second bearing 86 which closes the lower end of the crankcase.

Q. Is that number 86 there on the end of the crankshaft, is that a removable plate 86 located —

A. It is at the lower power take-off end.

360 The upper end of the cylinder in Figure 9 is closed with a cylinder head. I don't believe it has any numeral designation. That is the same practice as followed in Lechtenberg. In the figures 17 and 18 [of Conover] there is

Page of Transcript

disclosed an engine body, and it is made out of one casting with the engine cylinder 212 and water jacket 213, the top and side walls of a crankcase 214 and a fuel tank 215. Those are all formed in one casting. Some of the parts of the one casting are unnumbered. The engine cylinder, 212, water jacket 213, and then on the crankcase 214 it has the top and side walls which have no numbers. And then the fuel tank 215. The wall of the crankcase opposite the cylinder is one casting with the cylinder. As shown this is — this would be for an outboard motor. And the walls that are formed integral with the cylinder are the upper wall and the wall opposite the cylinder, and it has a lower wall that is removable. He specifies
361 die casting. Figure 18 shows the entire crankcase as a single casting with the cylinder, except for the removable wall 136, which is the power take-off wall — the end wall of the crankcase. And it might be noted insofar as figure 17 goes, that also shows a liner incorporated in the cylinder. The descriptive portion in the patent describing figures 17 and 18 is on page 4, column 1, beginning with line 19, and it states there that figures "17 and 18 do not go into detail with regard to water passages or passages for the admission or transfer of the combustible charge. The purpose of Figs 17 and 18 is to disclose an arrangement in which a single casting, preferably made by die casting, includes the engine cylinder 212, its jacket 213, the top and side walls of the crankcase 214, the fuel tank 215 and flanges 216, which provide fairing along the sides of the cylinder." And then as a further part of that
362 description and beginning also on page 4, column 1, line 45, it states that: The bearing sleeve 136, which is the removable closure for the bottom side of the crankcase, as shown in figure 17, "Will ordinarily be extended to

comprise a housing for the extension of the crankshaft 241 in an outboard motor structure, but it may be otherwise designed for other uses." From there on it mentions the matter of the casting, as to how the cores are to be withdrawn to form the various constructions in figures
363 17 and 18. I don't believe that he specifically refers to Figs. 17 and 18, that there is any description made of the cylinder liner. But the liner is specifically mentioned as being incorporated, on page 1, column 2, beginning at line 48. And also following Figs. 17 and 18 in the portion referred to above on page 4, column , beginning with line 67. It mentions it in each of the constructions. On page 1, column 2, beginning there at line 48, where Conover says: "A sleeve 20 of iron or other suitable material is cast as an insert into a single die casting unitarily providing the dual cylinder block 21 and that half portion 22 of the crankcase which is contiguous to the cylinders."
364 By that, he does not intend to mean even having the insert cast as an insert into a single die casting. That is, putting the insert into a single die cast and still having it as your cylinder liner.

Now, in the Conover disclosure on figures 17 and 18, the parting line in the die casting of the cylinder-crankcase is in the removable closure 136. In other words, in the bottom wall of the crankcase is where the parting line is. That wall is removable. The parting line of Lechtenberg is in the same place.

* * * *

366 The chart Exhibit D-126 faithfully and correctly reproduces Figures 17 and 18 of the Conover patent. I have compared Claim 1 of the Lechtenberg patent with the Conover disclosures. Referring to Chart D-126 which

Page of Transcript

has the elements of Claim 1 of the Lechtenberg set out. "A. A single cylinder internal combustion engine having a crankcase with two spaced apart side walls." Those are shown on the Conover patent. The crankcase is 214. The upper wall has no number, but it is just to the left of the numeral 214. There is a lower cover 136. "B. Each of which carries a crankshaft bearing," — the bearing is unnumbered in the Conover patent, but they are clearly disclosed. It is lettered on the chart as B. C is the cylinder, which is 212, and designated on the chart as C. "D — and a crankshaft journaled in the bearings with its ends projecting from the crankcase," designated
367 on the chart as D, and on the patent as 241. "E — one end of the crankshaft having a flywheel mounted thereon," designated as E, and the patent designation is numbered 132. "F — and the other end being the power take-off end of the shaft." That is designated by the letter F — and the bearing sleeve will ordinarily be extended to comprise a housing for the extension of the crankshaft in an outboard motor at the lower end of the shaft 241 which is the power take-off. "G — characterized by the fact that: the cylinder and all portions of the crankcase including the wall thereof remote from and facing the cylinder, except that wall of the crankcase which carries the bearing for the power take-off end of the crankshaft is a single casting;" — that is designated by the letter G, and that includes the cylinder, the crankcase portion, 214, and there is also designated the wall opposite the cylinder which is formed as an integral part of the crankcase, and the cylinder casting, and the end wall. There is at the power take-off a removable closure, 136. And, "H. — and further by the fact that said wall of the crankcase which carries the bearing for the power take-

off end of the crankshaft is provided by a cover removably secured to said casting so that said cover is interchangeable with others of different design to adapt the engine to any of a variety of different installations without necessitating alteration of the cylinder-crankcase casting." In the disclosure of Conover, which was read
368 previously, on Page 4, Column 1, and beginning with Line 48, it states: "The bearing sleeve will ordinarily be extended to comprise a housing for the extension of the crankshaft 241 in an outboard motor structure but it may be otherwise designed for other uses."

369 Referring to Figure 1 of the Bosma patent, the crankcase housing is designated near the lower right-hand corner as number 15, and the cylinder is designated by the number 16, and that appears toward the upper left-hand top of the drawing. Insofar as the construction of the cylinder and crankcase, the Bosma Patent merely refers to a casting — I am reading on Page 1 of the patent, and that appears in Line 47, and "a crankcase housing 15" which appears in Line 50, but the drawing clearly shows that the cylinder 16 and crankcase housing are a one piece casting. That is true of the entire crankcase, except the lower end which is formed of a two piece cover member. That is shown clearly in Figure 3. That includes what is referred to as an oil reservoir 14, and the reservoir cover plate 38 prime, the number 38 prime is carried towards the middle left of the drawing of Figure 3. The parting line of the Bosma patent, and again referring to Figure 3, is the sectional line
370 indicated as 6. That parting line is in the same place as shown in the Lechtenberg patent. The reservoir, I believe, is number 14. It is to maintain oil within its confines for any position of the motor shown in the Bosma

Page of Transcript

patent in conjunction with the oil reservoir plate which is designated as 38 prime, and plate number 38 prime has only two openings 38 in it which appear best in Figure No. 6. They are the oval shaped openings in about the middle of Figure 6. Where it is used as an outboard motor the oil is trapped within the oil reservoir whenever the engine is turned on either side, or where, in the case of, say, pulling a boat up on shore the motor is tipped into a horizontal position so as to keep the oil from running into the cylinder. What keeps the oil from sump 14 from running down the shaft in the reservoir 14, from running down the power take-off end of the crankcase 20, is the upright boss that carries the oil seal 31 prime. In the Bosma patent itself, on page 2, column 1, line 20, the boss is designated as extending upwardly from the bottom of the oil reservoir 14. And referring
371 again to the patent, Page 4, Claim 9, beginning with Line 3, it states: "A tubular boss extending upwardly from the bottom of the reservoir through which the crankshaft extends and within which the oil seal is positioned, said boss preventing escape of oil from the reservoir." Referring particularly to the cover 8, shown in Figure 5 of the Lechtenberg patent, the boss of Bosma would have the same function as the boss, I believe the numeral designation is 156 in the Lechtenberg patent. In Figure 10 of Lechtenberg patent the boss is 143. But in Figure 10, I do not believe the function of the boss would be the same as the function of the boss in Figure 5, because the cover 8, in Figure 5, is for a vertical shaft operation when the oil is carried in the cover, whereas in Figure 10 that cover would fit on the side of the engine.

372 Claim 2 of the Lechtenberg patent is set out on the chart Defendant's Exhibit D-127, and take the letter "A.

Page of Transcript

A single cylinder four-stroke cycle internal combustion engine having a crankshaft." The crankshaft numeral in Bosma is the numeral 20, and is designated by the letter A. "B. — a camshaft parallel to the crankshaft." And that is the camshaft 26 of Bosma. "C. — a cylinder." And that is the numeral 16 of Bosma. "D. — and a crankcase, through opposite walls of which the ends of the crankshaft pass." The crankcase is designated by the letter D and in Bosma the crankcase is number 15, and is the crankcase housing through the opposite walls of which the ends of the crankshaft pass — referring to Bosma, Figure 1 in the chart, one of the walls is the top wall which is formed as a part of the crankcase housing, and the other wall is the two piece cover consisting of the oil reservoir 14 and the reservoir cover plate 38 prime. "E. — one end of the crankshaft having a flywheel thereon." That is the upper end of the crankshaft, and the vanes on the flywheels are designated in the patent as 23. "F. — and the other end being the power take-off end of the crankshaft." That is the lower end of the crankshaft which is
373 secured to the propeller shaft 35. Designated as F in the chart. And "G" — designated as such in the chart — "characterized by the fact that: the cylinder and all portions of the crankcase including the wall thereof remote from and facing the cylinder, except that wall of the crankcase through which the power take-off end of the crankshaft passes is one casting." That would refer to the crankcase housing 15 being formed with the cylinder 16, and the wall comprised of reservoir 14 and the reservoir plate 38 prime is the wall through which the power take-off end of the crankshaft passes. "H." — of the chart — "by the fact that said wall through which the power take-off end of the crankshaft passes is provided

Page of Transcript

by a cover removably secured to said casting." And reservoir 14 and its cover plate 38 prime are removably secured to the crankcase housing 15 by bolts which are unnumbered in the drawing, but are clearly shown in both Figures 1 and 2, towards the lower end of Figure 2, and also in the same location relative to Figure 1. And, "I. — by the fact that the crankshaft and the camshaft are supported by said cover and the wall of the casting opposite the cover." It is best shown in Figure 2 of the chart designated by I. The camshaft 26 has its upper end supported and also crankshaft 20 has its upper end supported in the top wall of the crankcase housing as shown in Figure 2, and their opposite ends are carried in the two piece cover member 14 and 38 prime. "J. — and
374 by the fact that the supports for the camshaft comprise wells in the cover and said opposite wall of the casting." Insofar as the cover is concerned, there is a well shown in the lower end of reservoir 14. In other words, the camshaft does not extend through, and the same is true of the upper end of the crankcase housing 15 which supports the upper end of the camshaft 26.

Applying Claim 6 of the Lechtenberg to Bosma, referring to chart Defendant's Exhibit D-127-A, the letter designated A on the chart: "A single cylinder, four-stroke cycle internal combustion engine adapted for operation with its cylinder horizontal, said engine having in addition to its cylinder a crankshaft." The cylinder is designated on the drawing as 16, and the crankshaft as 20. The letter, "B," on the chart: — "B. — a camshaft parallel to the crankshaft." That is the camshaft 26 of Bosma, and the letter C designated on the chart — "and a crankcase with spaced apart top and bottom walls through which the upper and lower ends of the crankshaft pass."

That is the top wall, shown in Figure 2 of the chart, and the two piece removable cover shown in the lower end of Figure 2 on the chart, and with the letter D: — "D. — said engine being characterized by the fact that: The cylinder and all portions of the crankcase except its bottom wall through which the lower end of the crankshaft passes is one casting." And that is the crankcase housing 15 and the cylinder 16 formed as one casting; and the bottom wall, through which the lower end of the crankshaft 20 passes, is not formed with the housing 15 and cylinder 16. The letter designated E on the chart: — "E. — by the fact that said bottom wall comprises a cover removably secured to the casting and having a relatively deep depression." That is the two piece bottom wall that carries the numeral designations 14 and 38 prime and with a relatively deep depression being in the oil reservoir 14. "F. — by the fact that the camshaft is supported by the cover and the top wall of the crankcase." That again is the camshaft 26, and as shown, in both Figures 1 and 2 on the chart, it has one end supported in the top wall of the crankcase housing, and its lower end supported in the cover member. "G. — and the bearings for the crankshaft are in said cover and the top wall of the crankcase." And it is seen that there is a bearing in the upper wall for crankshaft 20 and a bearing in the two piece cover member designated as 30 in the Bosma patent. "H — further by the fact that the depression in the cover provides an oil sump." And that is the oil reservoir 14 of Bosma. And, "I: — and said cover being further characterized by mounting means formed integrally therewith for mounting the engine with its cylinder horizontal." Those mounting means are shown in Figure 2 and possibly somewhat better in Figure 3 of

Page of Transcript

the Bosma patent as the annular flange that extends from
376 the bottom of the oil reservoir 14, immediately surrounding the boss portion for the crankshaft 20.

Reading a typical claim such as Claim 6 on the Lauson engine, defendant's Exhibit D-78, referring to chart Defendant's Exhibit D-128 which carries the Claim 6 of Lechtenberg: — "A. — A single cylinder, four-stroke cycle internal combustion engine adapted for operation with its cylinder horizontal, said engine having in addition to its cylinder a crankshaft." And the elements of the claim are set out (1) A cylinder. And that carries the number 1. On the corresponding portion of the photo 2 is the crankshaft which is a separate photo. That is designated as 2. "3. a crankshaft" — also designated
377 by the number 3, and the relationship of the crankshaft and the camshaft being parallel is shown in a reproduction of Figure 2 of the patent which is carried below the photo. In the actual engine the crankshaft and the camshaft are parallel. "4. — a crankcase with spaced apart top and bottom walls through which the upper and lower ends of the crankshaft pass." The numeral designation shows what is the upper wall in the main casting, and in the portion immediately below that is the oil reservoir 14 and the center opening would be where the crankshaft extends through. "Said engine being characterized by the fact that: the cylinder and all portions of the crankcase except its bottom wall through which the lower end of the crankshaft passes is one casting." That one casting is designated by the number 5 in the chart. In the upper left-hand. "By the fact that said bottom wall comprises" — and that is designated by the numeral 6 — "a cover removably secured to the casting" — and that cover would be the two pieces compris-

Page of Transcript

ing the one piece that has a sort of a gooseneck formation on it, and the other piece which goes to form numeral 6— is the oil reservoir plate. "And having (7) a relatively deep depression" — and the depression, in the cover des-
378 ignated 6, as indicated in the middle photo — "by the fact that the camshaft is (8) supported by the cover and the top wall of the crankcase" — and is carried, as shown by the numeral 8 in the upper left-hand corner with its lower end in an opening, which is shown on the oil reservoir cover up towards the upper part of that photo, and which appears as the second one at the right on the top line. "9. — bearings for the crankshaft are in said cover and the top wall of the crankcase" — and the bearing, in the top wall, is indicated by the numeral 9, and the bearing, in the bottom wall, is also indicated by the numeral 9. "Further by the fact that the depression in the cover provides an oil sump." That is the depression within the cover and designated as 6, and having the gooseneck portion. "And said cover being further characterized by mounting means formed integrally therewith for mounting the engine with its cylinder horizontal," is the mounting means 10. I do not see any numeral designation on the chart, but that is shown in the chart as being the annular flange projecting downwardly from the oil reservoir 14. That appears on the actual Exhibit D-78. Cover plate D-79 also responds to ele-
379 ment 10. On Exhibit D-79 the mounting means that responds to element 10 of Claim 6 would be the downward extension from the oil reservoir.

Turning to chart Defendant's Exhibit D-129 of the Vansickle Patent No. 615,766. I find a response in the Vansickle patent to Claim 1 of the Lechtenberg patent. By referring to the chart Defendant's Exhibit D-129 the

Page of Transcript

letter (A) — "A single cylinder internal combustion engine having a crankcase with two spaced apart side walls."
380 The crankcase is indicated as 16 at the bottom of Figure 1, and it has two spaced apart side walls which are designated by the letter (A). "(B) — each of which carries a crankshaft bearing." Those bearings are designated as numerals 12 and 13. They are designated on the chart by the letter B. (C) — is a cylinder which is designated by the letter C, and the numeral 11. "(D) — and a crankshaft journaled in the bearings with its ends projecting from the cankcase." That is the crankshaft 14 which has its ends journaled in the bearings 12 and 13. "(E) — one end of the crankshaft having a flywheel mounted thereon." It is the letter E on the chart, and its numeral designation is 60. "(F) —and the other end being the power take-off end of the shaft." That is the end of the shaft designated by the letter F in the chart. "G — characterized by the fact that: the cylinder and all portions of the crankcase including the wall thereof remote from and facing the cylinder, except that wall of the crankcase which carries the bearing for the power take-off end of the crankshaft is a single casting." That is the single casting designated by the letter G, and the wall facing the cylinder which is the bottom wall as shown in Figure 1 is formed as a part of the casting 10, which includes the cylinder 11. Element 10 is described by Vansickle, on
381 Page 1, Column 1 of his patent, beginning with Line 39, "In the drawings, 10 indicates a casting the upper end of which is bored out to form the cylinder 11." An element H is shown in the chart, Defendant's Exhibit D-129: "And further by the fact that said wall of the crankcase which carries the bearing for the power take-off end of the crankshaft is provided by a cover removably secured

ge of
inscript

to said casting." And that would be the cover 15, also designated by the letter H. "So that said cover is interchangeable with others of different design to adapt the engine to any of a variety of different installations without necessitating alteration of the cylinder-crankcase casting." There is not anything specific in Vansickle speaking about interchangeability, but that is a functional statement, following a recitation of the removable cover, so that if it is removable there is no reason why it could not be interchanged. The structure is there.

The pertinence of Hennecke Patent No. 2,097,662 would be in his providing a standard windshield wiper motor in which he provides three standard adapters to fit about 200 different applications for the reason which he states in his patent. I am reading in the patent, Page 1,
82 Column 1, beginning with Line 23: "From the standpoint of the manufacturer who is turning out thousands of identical cars, such practice may be desirable, but from the standpoint of the accessory dealer who is required to replace windshield wiper motors, the practice has proven highly undesirable since in order to completely supply the trade the dealer must carry in stock several score models and a complete line of wipers would involve stocking nearly 200 different styles of motors to accommodate the trade if an exact duplicate of the worn or broken motor is to be used for replacement purposes." All he has done is to provide a standard motor—referring to Figure 1:—generally the base of it is indicated at 10, and that motor only carries the two mounting portions 15 to adapt it to all of the various mountings for a windshield wiper motor.

Page of Transcript

Briefly, and referring to Figures 1 and 2 of Fowler Patent No. 2,218,332, he discloses a one piece casting. That includes, as one piece, the cylinder head 16 which appears at the top of the picture in Figure 2, cylinder 14, and one bearing 18. The bearing end is 28. It is one end of the crankcase portion 18 which also carries a bearing for the crankshaft 24, and that portion of the engine,
383 to complete the engine body, is closed with a pan 40, which appears in the lower left-hand of Figure 2, and with a separation line being at an angle of about 45 degrees with the axis of the crankshaft. Figure 4 is a modified form in which the removable portion that is cut at a 45 degree angle with the crankcase 18 carries a cover 40 prime. The bearing for the crankshaft 24 is 80 — in addition to the crankshaft bearing which is carried in the main casting that includes the cylinder head 16 and cylinder 14; and again that cover 40 prime is put on at an angle of 45 degrees with the axis of the crankshaft and carries as an integral part lugs 82 by which the engine can be mounted. And referring to Figure 5, there is still maintained the same one piece casting of the cylinder head 16 and cylinder 14, and the casting, its counterpart to interchange with the cover 40 prime to produce a two cylinder engine, and with a parting line still being at an angle of 45 degrees with the crankshaft. And he states in his patent, on Page 2, Column 2, beginning with Line 19: "The above described feature permits the combined cylinder 14, cylinder head 16 and crankcase portion 18, forming an integral unitary structure." The way Fowler has it here it illustrates two cycle, but it also could be adapted to a four cycle. That appears on Page 2, Column 2 of his patent beginning with I think that would be Line 72: "While in the case of a four-cycle engine

or of a Diesel type engine this volume is not of such great importance and it may be made of sufficient size to hold the usual supply of lubricating oil or the like as will be appreciated by those skilled in the art." And he refers again to two and four-stroke cycle engines on Page 2, left-hand column, at Line 18. At that point it states: "The present invention is applicable for use in connection with internal combustion engines of either the two or four stroke principles, diesel engines or any other type of engine including a crankshaft and a piston reciprocable along an axis at substantially right angles thereto."

The Lechtenberg patent, Page 1, of the disclosure, Column 2, beginning with Line 5, says: "By contrast, the engine of this invention is so designed that it may be adapted to a wide variety of uses without in anywise changing the cylinder-crankcase casting." The disclosure of the Lechtenberg patent does not support this statement in the preamble because as previously described when it is changed from the horizontal shaft type of Figure 1 to the vertical shaft type, as shown in Figure 4, and as
385 stated in the Lechtenberg patent on Column 5, beginning with Line 25, and which was previously read,—the mounting feet 32 and boss 33 are removed from the main casting when it is to be used for vertical shaft operation; and, also, as previously explained, the oiling system is changed in that the bracket 165 shown in Figure 7 is further substituted for the dipper 22 shown in Figure 3. And again, Column 2, Lines 16 to 22, the Lechtenberg patent states: "To illustrate how easily the engine of this invention may be adapted to different uses, it might be noted that the adaption of an engine intended for ordinary general utility with the engine operating in

Page of Transcript

an upright fashion, that is, with its cylinder vertical, to horizontal operation as in rotary type lawn mowers, merely requires the simple substitution of one cover casting for another." That statement is not supported by the Lechtenberg disclosure, and for the same reasons given relative to the previously quoted Column 5. Referring now to Column 11, Lines 34 to 39, the specification states: "Thus, as already clearly shown, the same engine may be adapted either to general utility (in which case the engine operates with its cylinder axis vertical), or such special purpose as driving the blade of a rotary type lawn
386 mower (in which event the engine operates with its cylinder horizontal) by simply selecting one of two crankcase covers." The Lechtenberg patent disclosure does not support that for the reason that the legs 32 and the boss 33 are removed and it requires a different lubricating system.

The Court: Am I correct that you are talking about the disclosure of the patent, and not about the disclosure of the machines they have shown in the moving picture and otherwise?

Witness Lowell: We are referring to the disclosures as made in the patent as not supporting those statements of the patent. No, they are not supported there.

The Court: You are not interpreting them in the light of the engine as actually made?

A. I am interpreting them in the light of the disclosure of the patent.

387 It is my opinion that Claim 5 of Madle does not read on the defendant's structure. Briefly, and referring to the chart designated as Defendant's Exhibit D-132, and referring to the numeral (1), "a member carried by said

Page of Transcript

388 rotatable part for rotation therewith and for motion relative thereto in response to centrifugal force." The only element of defendant's structure upon which that part of Claim 5 can read would be the centrifugally actuated arm designated at the right-hand side of the chart by the numeral 1, but that member does not have a cam surface on said member engaged by said cam follower for imparting motion to the cam follower in said direction once each revolution of the rotatable part to effect breaker point separation at instants depending upon the speed of crankshaft rotation and the position of said member relative to the rotatable part as determined by the centrifugal force acting on said member. In the defendant's structure, the cam forms what might be called a sleeve member designated by the numeral 3 in defendant's structure in D-132, and it is interconnected with the arm 1 by what might be called a tooth in a gear connection. And the member 3 only moves in response to the force exerted on it by the centrifugally actuated arm 1, and there is no cam surface on the member No. 1 designated in blue on the chart.

Cross Examination

391 Q. If you knew, or had learned, that men skilled in the art ordinarily and usually referred to a cylinder crankcase body like Clinton — you know that there is a liner in there, in the Clinton lightweight crankcase cylinder body, like Plaintiff's Exhibit 16-C — if you knew that they ordinarily referred to such unit as a casting and even though it had that liner in it, would that change your opinion that the Lechtenberg claims do not read on the Clinton engine because of its iron cylinder liner?

A. No, that would not change my opinion. Because in the Lechtenberg patent, I feel that if the liner were

Page of Transcript

to be included as a part of the cylinder and crankcase one piece casting that Lechtenberg would have made a disclosure of it to include it in there rather than to make a specific exclusion of it in his patent.

Q. Does he specifically exclude it from his patent?

A. I would say that he does. I would again like to refer to the Lechtenberg patent, Column 4, to where it refers to, beginning with Line 75 at the bottom of Column 4, beginning with Line 75: "The crankshaft is of
392 conventional construction but the piston 5 though of conventional design and cast of aluminum alloy is distinguished by the fact that it is plated with chromium or some other suitably hard wearing metal. By this expedient it is possible to have both the cylinder and the piston formed of the same basic die casting metal without incurring the cost of lining or plating the cylinder wall, for contrary to previous belief, it has been conclusively demonstrated that the piston rings will not unduly wear a naked, unprotected aluminum alloy cylinder wall. The saving thus effected is substantial since to plate the piston costs but a fraction of what it costs to either plate or line the cylinder wall." So it is my opinion that, in keeping with reduction of cost as one of the main objects stated for Lechtenberg, he definitely excluded a liner from being included as a part of his casting.

Q. Isn't it true that the disclosure of a patent may describe and point out features some of which may even be entirely novel to the patentee, which he recognizes as novel, but which he does not claim in the patent?

A. That is true; and where some of those things are
393 pointed out, and they may be novel and he doesn't claim them, then, of course, they are dedicated to the public.

Page of Transcript

But to me, it is clear that he did claim exactly what he had, and that is, one casting, or a single casting, because he expressly excluded the liner.

Q. Now, I will ask you another hypothetical question: Suppose you are the attorney for somebody who has an invention involving some subsidiary invention, suppose he has a new kind of a cylinder, and basically new you say, and suppose there is some subsidiary invention on it, a new kind of a fin, how would you write a claim that only claims that cylinder without also including the new kind of a fin?

A. Do I understand from your question that something in the cylinder was novel without including the fin?

Q. Yes, and the fin was also novel, and you want to claim the novel feature of the cylinder without claiming the novel thing about the fin?

A. I would describe and disclose the cylinder without putting the fin on, and put on the fin, as a modified form, and write the claim both ways.

Q. How would you write the claims that did not include the fin?

A. Write a claim to the cylinder without including the fin.

Q. You said that you would claim it both ways, how could you do it without including the fins?

A. By not including the fins in one of the claims.

394 I would consider that so far as the Conover Patent engine of Figures 17 and 18 being used as a lawn mower engine that it would be a matter of equivalence to substitute fins for the water jacket — that is something not outside of the realm of design. Conover wants to use it for

Page of Transcript

395 outboard motors. As shown there that would be its primary use. Insofar as other uses are concerned, you could use it any place that water might be available, such as farm use if they have water there, just connect it up.

Q. What is your understanding of the terms "constants" and "variables"?

A. As they have been used in this case, and as to the constants, I don't have any understanding of it whatever. As applied to engines, I have never heard any discussion as to where you could say, referring to an engine, and say that something in it was either variable or constant, I don't know.

Q. Do you recall, or not, with reference to this statement in the record, and I am reading from the last three
396 lines of Page 524 of the trial record and the first couple of lines on Page 525 of the testimony of Mr. Cantor. It says here concerning the Lechtenberg invention: "The Lechtenberg invention apparently is the location of constants — all constant elements which will not be changed, in one casting which is the expensive casting, and the location of non-constant elements in a relatively inexpensive base plate." Do you recall reading that?

A. Yes, I recall reading that. It did not mean anything to me at the time, and frankly, it does not mean anything to me at this time.

Q. Did you call on Mr. Cantor to find out what he thought about it?

A. No, I did not.

Page of Transcript

399 LEO J. LECHTENBERG

Direct Examination (Adversely)

Leo J. Lechtenberg. Age forty-two. I reside at 1040 Katherine Drive, Elm Grove, Wisconsin. Occupation, development engineer. I have been employed by the Briggs & Stratton Company since 1938. I am the Leo J. Lechtenberg whose patent is here in suit.

400 Immediately after graduation from school, in 1938, I started in the Briggs & Stratton engineering department, and I was first employed as a draftsman, then project engineer, and later on as development engineer. I was educated at Marquette University. I received a Bachelor of Mechanical Engineering Degree in 1938.

Briggs & Stratton makes die cast automotive locks. They were in the die casting business at the time I entered their employ. I don't think I could state the exact time I first learned of die casting as applied to gasoline engines. I know that there were two cycle engines that were die cast prior to 1950. I know some of the outboard engines
401 were die cast. I cannot state specifically, I do not have any specific engine in mind. I knew of Evinrude and Johnson motors. I don't know if McCullough was made before 1950, but I knew of it before I started working on my engine which is the subject of this patent.

402 Before I started my development work which matured into the patent in suit Briggs & Stratton was making four cycle internal combustion engines. The cylinder and crankcase were made of cast iron. Sand cast as shown in the pictures. The cylinder was an integral part of the crankcase. The cylinder head was not an integral part of the cylinder. In fact, two sides of the crankcase were

Page of Transcript

also open, the magneto side and the base side. By the "base side" I mean the side opposite the cylinder. In other words, the side wall of the crankcase that held the bearing for the power take-off end of the crankshaft was solid with the cylinder, the same casting.

Q. What was the thing that caused you to move on to a different type engine?

A. We are always striving for better designs, and more specifically I was trying to make the best four cycle air cooled die cast aluminum engine that I could make,
403 that economically could be produced in production.

Q. What was wrong with the cast iron engine that you were making?

A. Nothing wrong with it. It was a good engine, and we are still making that engine.

But we wanted to keep abreast of the march of progress so that it is our regular practice to improve our products continuously.

Die casting as such was being practiced in 1938. Magneto plates on our engines were die cast. I believe in 1938
404 some of the carburetors were die cast. Many things were made of die casting before 1938.

Q. During the course of those eighteen years can you name any items that are now made of die casting that were previously made of cast iron or sand casting?

A. Yes, the base of our engine previously was sand cast, and is now die cast. There are other parts, cylinder heads and the like.

Q. Is it not true that when you got out of school in 1938 that die casting was really in its infancy?

Page of Transcript

A. No, I wouldn't say that. I think die casting goes back a long ways in our company; I couldn't say how many years.

405 I would say the practice of die casting parts that were previously made of sand casting increased down through the years since I came into the engineering field. The compelling reason why there has been this trend to die casting is that if you are constructing a product so that it can be die cast and so that it will operate satisfactorily, usually you have the advantages of being able to make the parts more economically. Die casting is a matter of economics then.

406 Q. It is the economy of die casting that compels the manufacturer to produce more and more things by die casting?

A. All parts can not be produced by die casting.

Q. That is correct, but where you can produce them by die casting, if it is a large production, it is usually more economical to produce them by die casting than sand casting, is it not?

A. I would say that it is more economical to produce them by stampings, and secondly by die casting, and thirdly by sand casting.

Q. Is it more economical to produce the engines shown in your patent as a sand casting or as a die casting?

A. Die casting.

Q. But those could be produced either way?

A. Ordinarily any part that can be die cast I believe can be sand casted.

Page of Transcript

Q. But in your patent those could be either die cast or sand cast, isn't that correct?

A. There is no point in restricting a die casting assembly to die casting because it can be sand casted.

407 Q. Is aluminum sand cast?

A. It can be, yes.

408 Mr. Hugh Brown of our company gave me a directive to work on this engine. He outlined as my project to strive to make the best four cycle air cooled engine that I knew how to make that could be die cast. Previous to that we
409 had not been able to successfully die cast engines. For years we had been wanting to make an engine in die casting, but we did not know how to do it and make one that would operate.

Q. Other engines were die casted, and you were familiar with them and they were on the market?

A. They were two cycle engines. It is an entirely different problem to die cast a two cycle engine than it is to die cast a four cycle engine.

Q. What is the difference in the problem?

A. That gets into the differences between a two cycle and a four cycle design, and it would take a long discussion, but basically you have valves, and intake, and exhaust ports on the four cycle engine and you have to get cooling around those valves and also around the block. The valve ports must be in close proximity to the cylinder block or you do not have an efficient engine. To get them into close proximity to the cylinder block it becomes very difficult to be able to cast the cylinder and keep it at temperatures where it will operate.

Page of Transcript

Q. There is no problem in making a sand casted cylinder and crankcase assembly in one casting, is there?

A. Not nearly as much a problem as die casting.

Q. It had been old for years before you ever got into
410 this development to sand cast a four cycle engine cylinder and crankcase, wasn't it?

A. Yes, sir.

These problems that I mentioned about getting the valves near the cylinder wall, and so forth, that problem was present in the cast iron engine. But the cores between the ports, so-called rib cores in the film, were destroyed in the process of getting the sand out between the fins.

Q. Your problem was a die casting problem primarily, wasn't it?

A. I did not say so. You had a combination of problems. You had a problem of making a die castable four cycle single cylinder air cooled engine that would be economical to produce and to make it in such a way that the number of variations in the cylinder crankcase casting would not be so great that we could not afford to invest the money in expensive molds necessary for the cylinder crankcase.

Q. Mr. Brown came to you and told you, "We want to make a die cast engine," is that correct?

A. Substantially.

That was my first notice that we were going to con-
411 centrate on this. I don't believe Mr. Brown told me what parts of the engine he wanted to die cast.

Q. Your patent is not concerned with whether it is die casted or sand casted or made of iron or aluminum?

A. It is concerned to the extent that it must be die castable.

Page of Transcript

Q. You think that any of the benefits you get from your engine are not obtainable unless it is die casted, is that correct?

A. I didn't say that.

412 The metal is not specified in the patent. The engine would not work if it were made of zinc, for instance. It also says that you can use sand casting instead of die casting. Many of the advantages that I attribute to my engine will be present if I make the engine out of a sand casting. Those advantages will be present if you make it out of any other metal, other than aluminum.

413 We are making more die cast engines than sand cast. Considerably more. Probably more than the ratio of three, four, or five to one.

Part of the advantages that follow from my engine are attributable to the fact that we make it of die casting. Part of the advantages are due to the fact that we make
414 it out of aluminum.

Q. You are aware of the fact that there has been a tremendous trend in American industry to die casting, is that not correct?

A. There has been quite a trend to die casting. Even though you could die cast the part, that does not say that the part will function correctly though.

Q. I am not disputing you on that, but you have more and more competition and the trend is definitely to cheaper and more economical methods of manufacturing, would you say that?

A. Certainly we are always striving for that.

And die casting is one of the methods which helps to cut the cost.

• • • •

Page of Transcript

420 [The Lechtenberg patent] shows how the slinger is used for the vertical shaft engine and how the dipper is used for the horizontal shaft engine, and if you want the engine, if you had an engine that would be run in both directions you would put both in, and we have been requested to do so by customers. As I see it, the patent
421 teaches that if you want to run this engine as a horizontal shaft engine you would have a dipper. If you want to run it as a vertical shaft engine you would have the slinger
422 gear and bracket. If you want to run it for both purposes you would put both of them in.

Q. But it would be restricted to one cover?

A. No, you can put on any variety of covers.

Q. You wouldn't want to use a cover unless —

A. There are certain covers you would not want to use, but you can put in any variety, you can put on either of the two lower covers, or both.

Q. The statement is found in Column 2, Lines 15 to 22, and it says that to convert from a horizontal shaft to a vertical shaft engine you merely change the cover, that is not the teaching of the patent, is it?

A. I would say that with the other teaching in the patent to — I can't think of the word in the patent — I think we are getting into a question of patent description, and I don't know that I am qualified for that.

Q. Point out in the patent where it tells you how to
423 convert a horizontal shaft engine to a vertical shaft engine by merely changing a cover plate. Will you show me where it says that, where it shows you how to do it in the patent?

• • • •

Page of Transcript

A. As an engineer, it looks to me like you could interchange cover 8 in Figure No. 5 with cover No. 7 of Figure 2; and there is nothing in Figure 2 that shows the slinger gear did not happen to be assembled in that engine.

Q. Where does the patent teach mounting the slinger
424 gear in both lubricating systems in one engine?

A. I don't know.

I have seen engines with the cylinder and crankcase separate and the cylinder bolted to the crankcase. I think there were about the same number made one way as another.

Q. It was common practice to make the cylinder head separate from the cylinder?

A. That again, on a four cycle engine — or two cycle engine, the cylinder head was sometimes attached to the cylinder casting. That was on two cycle engines.

It was the prior practice to make the crankcase with some of the walls removable. You had crankcases where
425 the flywheel wall, the wall adjacent to the crankcase, was removable. You had some where the wall opposite the cylinder was removable.

Q. You had some where the wall that supports the power take-off end of the crankshaft was removable, is that correct?

A. I don't specifically recall any engine made that had that wall removable, but there might have been.

Q. Were you familiar with the Lauson Sport King engine?

A. Not at that time I wasn't.

Page of Transcript

Q. You are with it now?

A. Yes, sir.

Q. Does that have a removable wall that supports the power take-off end of the crankshaft?

A. There is a cover in that wall, but I wouldn't say that the whole wall is removable. This part of the wall is — and there is an opening in the wall.

Q. How much of the wall is left — I don't want to get into a question of semantics.

A. The Exhibit No. D-78 speaks for itself. There is a
426 certain amount of wall and a certain amount of hole.

Q. So that when you say the entire wall is not removable, in this Lauson engine D-78, you refer only to that small portion which constitutes the flange around the opening of about one-eighth of an inch in width?

A. Some portion — it is around three-eighths of an inch.

Q. Would you say it is one-fourth or one-eighth of an inch?

A. I would say it is closer to one-fourth or three-eighths of an inch.

Q. To that extent the entire end wall that supports the power take-off end of the crankshaft is not removable?

A. That's right.

I disagree with Mr. Wolcott when he says that this
427 cylinder and crankcase D-78-A could be die casted. Because I think it would be impossible to make a workable engine and still be able to die cast between the intake and exhaust ports. There is an under-cut in back of the intake port between the intake port and the exhaust port, and I don't know any way to die cast that without mak-

Page of Transcript

ing a destructible core, such as plaster of Paris core, that can be used inserted into the die casting, and that certainly would not be an economical die casting method. I don't think there is any conventional die cast made that way. It is somewhat difficult to point it out on Patent No. 2,693,789, because the construction is different than on the Bosma engine. I do not believe I said that you
428 could not die cast this [Lauson cylinder and crankcase] assembly if you changed it, but in the state it is in you cannot die cast it economically.

Q. Your opinion is that you cannot die cast defendant's Exhibit D-78-A, Lauson cylinder and crankcase as it is?

A. No, not as it is. If you made a number of changes you could die cast it.

Q. Where in your patent, will you point out the differences that make your cylinder and crankcase die castable whereas the Lauson is not—you said something about the valve—I didn't understand you—one feature you said?

A. On Exhibit D-78-A there is a flange to which the carburetor is attached. This flange has an under-cut, underneath the flange and there are also fins underneath this flange attached to the barrel—and—I don't know any way you could get the die cast core out of there without making it a destructible core.

Q. You can use destructible cores in die casting?

A. I don't see any reason why you could not use a plaster of Paris core or something like that. I don't know anybody who is doing it, and I don't think it would be economical.

Page of Transcript

Q. Is there any question in your mind that you could
429 sand cast Defendant's Exhibit D-78?

A. Not at all.

Q. Where in your patent is there anything that shows how to die cast a cylinder and crankcase?

A. The engine shown in the patent can be die casted.

Q. It doesn't teach you how?

A. I think the film illustrates pretty well how it is done.

Q. Can you not respond to the question that I asked you; does your patent show you how to die cast the cylinder and crankcase?

A. If I knew nothing about die casting I don't think it would.

If you have only the wall opposite the cylinder removable you cannot assemble the engine. I don't know any
430 engines that have only that wall opposite the cylinder removable, with the two side walls more or less as you illustrate there in your hypothetical question. There were engines made with the flywheel wall removable, I believe.

Q. Was the engine assembled through the opening?

A. On the flywheel side.

Q. And the engines operated?

A. Yes.

I don't believe the Lechtenberg engine cylinder functions any differently when the flywheel wall is removable than it does when the power take-off end wall is removable.

Page of Transcript

Q. This cylinder up here that is operating it doesn't care whether the flywheel wall is removable, or the power take-off end wall is removable, does it?

A. I would say that it would not make a great deal of difference.

431 Q. It will not make any difference, Mr. Lechtenberg?

A. There are problems such as breathing that you have to lick and the like that might bother. Without actually going into the design, I couldn't say for sure.

Q. Take his own engine here — this happens to be a Clinton engine — Defendant's Exhibit D-114 — let's make this wall the removable wall. We will leave it as it is and we will take the flywheel wall and make that removable by bolting it down and securing it by bolts. Will your cylinder operate any differently?

A. No, it would be the same.

Q. It would be the same — right — if we take your engine and cast the cylinder separate from the crankcase by securing it by bolts you would not have one integral cylinder casting, but you would have two castings and I don't care whether they are sand cast or die cast, by securely bolting the cylinder to the crankcase does the cylinder function any differently in that case?

A. I would say the same.

Q. Isn't the same true that the crankcase does not care whether the cylinder is cast as a single casting with the crankcase, or whether it is made as a separate piece and bolted to the crankcase?

A. I think you have a separate cylinder. You have many problems that you do not have with an integral one.

Page of Transcript

432 Q. From the standpoint of assembly and manufacturing?

A. Also operation.

Q. What function does the cylinder perform — you said that is merely a place in which the piston moves up and down

A. That's right, but if you put a joint in between the cylinder and crankcase you have a lot of other problems.

Q. You would not have that problem if you put a liner in, would you?

A. Yes, I would think you would have a lot of problems.

Q. You would not have a joint if you had a liner?

A. Yes, if you have a liner in the cylinder and the cylinder and crankcase are a two-piece assembly you have a problem where the cylinder is fastened to the crankcase from the standpoint of the gasketed arrangement and valve chamber construction.

Q. But the cylinder still functions just the same?

A. Yes.

Q. By the same token if you made this wall, that is the power take-off end wall, we will make that integral or cast with the remainder of the crankcase, but we will have the flywheel wall removable, this cylinder does not know which of the walls is removable?

A. From the standpoint of the piston moving up and down I would say no.

Q. From any other standpoint then it would not make any difference if you made your casting with the wall removable or with this wall cast integrally?

Page of Transcript

433 A. The cylinder barrel as such would not know the difference. The engine might.

Bakke shows the opening in the power take-off side with a removable cover similar to our Model 23 cylinder, Plaintiff's Exhibit No. 20-B. This opening here is the hole in the power take-off side.

Q. You cannot change that plate 18, in Bakke, or the plate on the Exhibit that you refer to without changing the cylinder and the crankcase?

A. Yes, but if only that plate is removable you could not assemble the engine. There are other plates on that
434 engine that are removable.

Q. On your engine or Bakke's?

A. Both.

Q. Is it your contention, or your statement, or testimony that in Bakke you cannot insert the crankshaft 14 through this opening covered by the closure plate 27?

A. No, you cannot assemble the connecting rod on that engine, because you cannot get at the connecting rod screws from the back portion of the engine. The side wall opposite the cylinder, in that engine as made in the practice, had that wall open.

Q. Was the engine of Bakke actually made?

A. The Continental engines, I don't know if they are made according to Bakke's patent, but similar to that had that wall open. I think that is diagrammatic, that sketch.

* * * *

437 *The Court:* Where does the patent show which are the variables and which are the constants of the engine? I address that question to you, Mr. Lechtenberg, but if counsel knows counsel may answer.

Page of Transcript

Mr. Jones: The witness can answer.

438 A. I think it is outlined all through the patent. Let's start at Column 1, Line 81, and there it states as follows: "Heretofore the ordinary single cylinder, internal combustion engine was so designed that to adapt the same to different uses often entailed an entirely new cylinder-crankcase casting. This would rule out die casting and the obvious savings effected thereby since the cost of the dies involved would be prohibitive. By contrast, the engine of this invention is so designed that it may be adapted to a wide variety of uses without in anywise changing the cylinder-crankcase casting. Only the cover of the crankcase need be changed, and since the dies involved in the production of the cover castings are by no means as complicated and expensive as those required for the cylinder-crankcase casting, even die casting the cover unit is feasible, and for shorter runs where the cost of tooling up is not warranted, sand castings may be employed for the covers." Then it goes on to state: "To illustrate how easily the engine of this invention may be adapted to different uses, it might be noted that the adaptation of an engine intended for ordinary general utility with the engine operating in an upright fashion, that is with its cylinder vertical, to horizontal operation as in rotary type lawn mowers, merely requires the simple substitution of one cover casting for another." In other words, there again is your variables.

Q. In other words, the only constant that you have in this case is the crankcase and cylinder?

439 A. It is not the only constant in the engine. The cylinder heads and a lot of other parts are the same.

* * * *

The Court: It is clear to the Court what is meant by constants and variables. We have the illustration of the

Page of Transcript

vacuum cleaner. The operating mechanism is the constant, and if you want to put the attachments on it you put on the variables. Rightly or wrongly, the Court has not been in confusion about it. Proceed.

• • • •

442 Q. In converting from the Sport King outboard to a Power Head is the cylinder and crankcase cover, which is red and identified as Exhibit D-78-A, is that changed, the casting itself?

A. The casting itself I do not believe needs change. I don't know if I am qualified to state. I have never run it either way.

• • • •

445 Q. According to that teaching, the cylinder and crankcase of the vertical shaft engine are not constant when used on the horizontal shaft engine, is that not correct?

A. I think it is all a matter of choice and appearance, the way that we presently have the fuel tank mounted, and to save the aluminum, we remove the feet.

Q. I am restricted to the patent. I don't care what your practice is. Your patent does not teach that you have a choice, the patent does not teach that you have a choice of omitting the feet and the bosses 33 when you convert from a vertical to a horizontal.

446 A. I don't know anything in the patent that says you cannot do it.

Q. You don't know anything in the patent that says that you should do it, do you?

A. No.

Mr. Jones: We have gone all through this before.

The Court: Sustained.

Page of Transcript

Mr. Raisch: I can understand why they do not want to have that question answered. That goes to the whole argument of constants and variables. The patent teaches that when you go from a horizontal shaft engine to a vertical shaft engine, or vice versa, you make changes in the main casting, both as to the casting itself, the weight, the bosses, and the machining, is that correct?

Q. In converting to a horizontal shaft engine to a vertical shaft engine you make changes in the main casting.

Mr. Jones: Functional changes, of course not.

Witness Lechtenberg: May I answer the question?

Mr. Jones: Functional changes, of course not.

Q. How about physical changes?

Mr. Jones: You may cut a foot off.

Mr. Raisch: You do cut feet off.

447 *Mr. Jones:* I will not indulge in argument now.

The Court: It is very material what changes have to be made. We call the upper part constants. I use layman's language. I might have it clear in my mind, but it is material whether you have to make those changes, from what I know of the matter of constants. Answer the question.

A. Those bosses provide a nice place to mount the fuel tank, and, although we are not doing it that way at the present time, we have considered mounting the tank in that manner.

Q. Excluding your practice, I am not interested in that, the patent, in fact, teaches and spells out that in the

Page of Transcript

horizontal shaft engine you have the feet 32 on each side of the casting and the bosses 37, which you drill for an oil filter or outlet for it, I should say, is that correct?

A. Yes.

Q. The patent teaches that when you use the engine as a vertical shaft engine you omit feet 32 and drill bosses 33, is that correct?

A. I think that is correct.

448 *Cross Examination*

Q. Can any part that is adaptable to sand casting be also die casted?

A. No.

Sand casting requires more machining than die casts.

450 *Redirect Examination*

Q. Will you refer to your patent, Mr. Lechtenberg, and refer to Column 6, and Figure 17 of the drawing, and I will read Line 47, and I think it refers to the element 64 of Figure 17, and it says there, beginning on Line 47: "By virtue of the fact that the wall 64 is cast integrally with the crankcase-cylinder casting and joins with all of the cylinder cooling fins in the manner described, still another very important advantage is obtained, for as will be apparent to those skilled in the die casting art, a portion of the die in which the wall 64 is cast provides an excellent gate through which the molten metal may rapidly flow to quickly fill up the portions of the die in which the cylinder per se is cast. This assures the desired metal density in that portion of the casting where imperfections would be most serious." Explain that last sentence: "This assures the desired metal density

Page of Transcript

in that portion of the casting where imperfections would be most serious."

A. In die casts, many times we have a certain amount of porosity, and we usually attempt to get the most sound portions of the casting to be without porosity at the places in the casting where it is most desirable to have a sound casting, and since the cylinder bore, the valve guides, and the upper portion of the cylinder are the portions we desire to be of sound casting, I provided the gate in this
451 region or near those portions.

Q. In other words, it is important then not to have any pores or holes in the cylinder wall?

A. I would say in general, yes. You, of course, cannot have any holes in the crankcase wall either.

Q. This refers to that portion of the casting where imperfections would be most serious, that refers to the cylinder wall and the —

A. Valve ports, the guides in that portion there, that's right.

---

452 STIPULATION: The engine marked plaintiff's Exhibit number 35 may be received in evidence, and it is understood it is the first engine of the Lechtenberg patent that was completed and operated, and that it was completed in the fore part of March, 1952. It is also stipulated and agreed it is a sand casting. The engine marked plaintiff's Exhibit 36 is received in
453 evidence, and this is a commercial engine in which the variable or cover casting has been cut away except for a segment which is thought necessary to maintain the crankshaft and cam gear in assembled position, and this is a horizontal shaft engine.

Page of Transcript

Then, 36-A, the cutaway cover plate, marked 36-A, may be received in evidence, and it is the remainder of the part that is assembled to the engine 36.

As plaintiff's Exhibit 36-B the cover plate, which is labeled horizontal engine auxiliary power take-off. It is understood of course the cover plate has a segment cut out so it may be slipped off the engine. By horizontal engine we are referring to the fact that the cylinder is horizontal and the crankshaft vertical.

454 Exhibit 36-C is a gear reduction mechanical governor cover plate, which again has been cut out so as to admit its insertion on the engine Exhibit 36.

Plaintiff's Exhibit 36-D is a standard plain bearing cover which has been, as the others, cut out so as to fit on the machine.

Plaintiff's Exhibit 36-E is a plain cover — a plain bearing cover which has provision for mounting a cam or a kick-starter, and that like the others is cut away so it may be illustrated by application to the engine Exhibit 36.

Plaintiff's Exhibit 36-F is a standard horizontal engine cover plate, and horizontal has reference to the cylinder being horizontal and the shaft vertical, and that is likewise cut away — has a segment cut away.

LEO J. LECHTENBERG

Direct Examination

With reference to the first Lechtenberg engine, plaintiff's Exhibit 35, in March, 1952, it was a brand new engine which was operated as a horizontal shaft engine. In May of '52 I put the slinger gear, or had the slinger gear put in under my direction, and the vertical shaft cover was put on this engine, and it was operated as a vertical shaft engine for approximately one month. The engine Plaintiff's Exhibit 35 as it now stands has been operated by me and is today capable of operation in either horizontal or vertical position, with the crankshaft horizontal or the crankshaft vertical.

The cover shown in Exhibit 36-F is shown in figure 5 [of the Lechtenberg Patent]. And the cylinder is shown as item 4 in figure 4. So far as I know the cylinder shown in Exhibit 36 is the cylinder shown in the patent drawings of the Lechtenberg patent. Figure 3 discloses the feet, the drain plugs, and also the bosses for the horizontal slinger as shown in this casting. This exhibit 36-E is a crankcase cover for the horizontal shaft aluminum engine and is the cover shown in figure 10 of patent 2,693,789.

> *Mr. Jones:* So that the record will be clear it is understood these covers have a segment removed merely to facilitate their illustrative nature with the engine 36.

36-F is a crankcase cover for the aluminum engine and is the standard cover for that vertical shaft engine. It differs from cover 36-B, which is a cover for a vertical shaft engine, insofar that 36-B has an auxiliary drive boss so that you can have a power take-off off of the camshaft. Cover 36-A is a cover for a horizontal crankshaft

Page of Transcript

aluminum engine, and differs from cover 36-E in that it has four flange mounting bosses, is made for a ball-bearing crankshaft, and does not have the accessory mounting boss which is on 36-E, and it can be used for mounting hand or kick starters. 36-D is a crankcase cover for a horizontal shaft aluminum engine, and differs from 36-E in that it does not have the accessory mounting boss. 36-C is a cover and gear case assembly, the gear case being assembled to the cover to illustrate the manner in which this cover can be used. This cover is also designed for use with a mechanical governor, where cover No. 36-E is designed for use with an air vane governor, and designed for the flange mounting bosses on which the gear case may be mounted. In the circular disc-shaped portion on the outside of the cover Exhibit 36-C the internal gear assembly is mounted. The gear reduction running at one-sixth of the crankshaft speed. These covers 36-A to 36-F, both inclusive, are some of the
460 variables we have been talking about. But do not represent all of them.

Q. What have you to say as to whether all of the operations that were shown going down the line in that assembly of the Lechtenberg engine — that is, all of the operations shown in the movie, do they comprise all of the operations that are required and necessary to assemble the Lechtenberg engine?

A. No; naturally you have to assemble the carburetor, blower housing, and other parts. We only showed the assembling to the extent of what we thought was pertinent in this case.

In other words, the operations made were the conventional operations required of all engines. The operation was in the correct sequence as we showed it, up to

Page of Transcript

461 the point we showed them. There are operations after that. This was most of the assembly line we showed.

When Briggs & Stratton originally tooled up for the Lechtenberg engine the dies were originally made so that with an insert they would produce castings without the feet, and by removing the inserts make the feet. The first molds were made by changing one portion of the insert in the die so we could make castings either way. It is not the general practice to do it today. We have had such a demand for this engine that we have made a number of cylinder molds, and since we have a sufficient quantity of cylinder molds, and need that quantity to maintain our production, we use some of them for vertical and some of them for horizontal shaft engines. The cast-
462 ings will go down our machine line or assembly line interchangeably, with and without feet.

Q. So there may be no confusion, Mr. Lechtenberg, counsel for the defendant put in a Briggs & Stratton main casting as defendant's Exhibit D-123, and some difference was brought out in the casting as over the castings heretofore put in evidence. Will you please explain these to the Court and the reasons for them?

A. This is a recent sample of our vertical cylinders and as mentioned in previous testimony the bosses for the horizontal engine were omitted from this cylinder, and we did that to save the aluminum, since this cylinder was only going to be used as a horizontal crankshaft engine. The one I have in my hand is a horizontal crankshaft engine casting. Now, there are other changes also. The bottom that was referred to as missing from this casting, and which is normally present on a vertical shaft engine, this pocket was also omitted, since this is only a horizontal crankshaft cylinder. And this pocket

Page of Transcript

was omitted in here to simplify the mold construction, and again to save the aluminum. There is a change in
463 the breather shape and construction. By further experimentation we found this shape was more advantageous on the horizontal crankshaft engine and gave us further advantages over the baffle as shown in the Lechtenberg patent. But functionally the engine has not been changed in any manner.

Cross-Examination

36-A is shown in figure 21 in the patent. There is no
464 numeral reference. Figure 21 is designed to show the mechanical governor flange mounting cover, and that is what this cover is, ball-bearing cover. Figure 21 shows it as an external view of the cover.

36-B is not shown in my patent. Cover 36-C is not shown in my patent. I assume you mean in these figures. They are described in some of the wording, some of these covers are referred to, but not shown in the pictures or illustrations.

465 We use this cover 36-C on some engines without this gear reduction, but we showed the gear reduction unit on here because it is also used to mount the gear reduction unit. And then there is another cover that closes this gear case casting, which is the circular portion, to complete the gear case. The engine is complete though with this cover which normally fits on the engine. Exhibit 36-C is not shown in the illustration here. I would have to spend considerable time to check to see whether it is described or not.

36-D is the cover shown as item 7 on figure 3, and the portion that distinguishes it is the accessory mounting boss that shows up in that drawing. 36-F is the cover
466 shown in figure 5 of the patent.

Page of Transcript

Q. I am having a little difficulty, Mr. Lechtenberg, when you place one over the other they don't seem to fit.

A. Well, that is merely the boss we cut out for illustration purposes. Some covers are deeper than others, some bearings are longer than others. That is about the best we can illustrate that.

* * * *

468 Exhibit 36 is a horizontal shaft engine. And it is provided with a so-called oil dipper lubrication system. You have exactly the same lubricating system on this engine 36 when you use plate 36-A. And in order to mount that plate 36-A on this engine 36 we make no changes in the engine lubricating system, or any changes at all, except we use the ball-bearing on the crankshaft of that engine instead of the plain bearing. That is what this special cover is, that is the only change. We have no bearing in there at all. This cover carries a ball bearing, and the shaft is journaled in the ball bearing. The crankshaft that would use an inch size ball bearing could be used. In production we are not using the inch type
469 ball bearing, we use the metric sized bearing and we do change the size of the journal.

Q. Do you change the crankshaft then?

A. Yes, that is the size of the bearing on the crankshaft. Opening 784 against opening 875.

When you take 36-A off of this engine, plaintiff's Exhibit 36, and install plate 36-B on this engine, if you want to operate it as a horizontal shaft engine you make no changes; if you want to use it as a vertical shaft engine then you take the dipper off and put the slinger in. If you want to operate for both you put the slinger and the slinger gear in.

Page of Transcript

36-B is the one for auxiliary driving. The auxiliary drive or power take-off is off of the cam gear, in addition
470 to being off of the crankshaft, and of course you then have to change the cam gear casting. In other words you put in a different cam gear which had an extension and which serves as the drive shaft. The cam gear is exactly shown there with the exception it has an extension out through the end of the cover.

When you put on this plate Exhibit 36-C you have to make no changes in the engine Exhibit 36 except for the crankshaft again. On the end of the crankshaft we have a pinion, because this assembly is intended to be used for a gear reduction assembly. And the pinion, on the crankshaft, drives the internal gear. With this plate 36-C on the engine 36 that engine would be operated as a horizontal shaft engine.

Now, when you install this plate Exhibit 36-B on the engine Exhibit 36, you have to make no changes whatsoever.

When you install plate 36-F on the engine Exhibit 36, you make no changes whatsoever. 36-F has an acces-
471 sory mounting boss that can be used for mounting hand starters or kick starters, or some of our customers use it for other mountings. And this boss is not even on 36-D. 36-F can be assembled on the engine 36 as shown, with no changes, if you want to operate the engine as a horizontal shaft engine. If you want to operate the engine as a vertical shaft engine you put in the slinger bracket and slinger gear. If you want to operate it as both a horizontal shaft engine or as a vertical shaft engine you leave the dipper in and the slinger gear in. We are not selling any with both the slinger gear and

the dipper mounted at the present time. We have been requested to, but since we cannot supply the demand with the standard engines we have not gone into production of any of these special applications.

Q. Now, in your actual practice — when you use the engine as a vertical shaft engine isn't your machining
472 and drilling operations on the crankcase cylinder casting different than where the engine is used as a horizontal shaft engine?

A. Goes right down the same machining line.

Q. The same drilling operations?

A. The drills are there to drill the hole for the upper bearings in the crankshaft.

Q. What about the lubrication holes, are they the same?

A. I am talking about the lubrication hole for the upper bearing on a vertical shaft engine, and that hole is drilled only on vertical shaft engines — vertical crank shaft engines. Now, if the castings are made with that projection on, just as this casting shown in Exhibit No. 36, that hole would be drilled in all castings and plugged, and then can be used as either vertical or horizontal, which we have done on that engine, and did for awhile.

Now, that portion of the crankcase I am talking about is reference 163 as shown in figure 8 of the drawing of my patent, on sheet 4 of the patent, and the hole is
473 shown as No. 164.

Q. Now, the boss 163, do you put that — actually fabricate your castings on your horizontal shaft engine with that boss in it?

A. We did on the original casting, and we sold engines that way. We have since discontinued it, as I

Page of Transcript

believe I explained, because we have enough dies available it is no longer necessary to complicate the dies and waste the aluminum on that part.

Q. As I understand it you have two separate machining lines, one in which you made the crankcase and cylinder for the horizontal shaft engine, and the other for the vertical shaft engine.

A. No, that is not correct. The cylinders for the horizontal and vertical shaft engines go right down the same machining line.

Q. Well, by groups or at random?

A. We may take a hundred of one and a hundred of another, we don't mix them.

Q. You don't take them at random so the workman doesn't know what he is getting next?

A. Actually these individual molds vary, we haven't been able to make the molds accurately enough so our locking pins are absolutely correct, so consequently we keep the castings from each mold separate and try to run
474 them down the line in groups from each mold.

We don't distinguish between vertical crankshaft and horizontal, we just try to keep the cylinders for one day separate from another. We have some die-casting machines set up to produce only horizontal, and some die-casting machines set up to produce only vertical.

Q. That is on account of the difference in the two castings you are now making?

A. As a matter of choice, yes.

Q. Your film you showed didn't show the plating of the piston, did it, the chrome plating of the piston?

A. No.

Page of Transcript

Q. Do you do any chrome plating of the cylinder?

A. No, we only chrome plate the piston.

---

475 **HARRY SHORE**

Direct Examination

477 Although I am not directly associated with die-casting processes, Your Honor, my experience from 1942 on in having many contacts with manufacturing processes as visiting many engine manufacturer's facilities, and through my other experiences on engineering work during the period of 1942 onward, and in keeping abreast of the state of the art in this particular field, in my opinion I think I am able to state not necessarily the intricate processes connected with the design of a die casting but to indicate whether an item is or is not considered a casting.

In connection with the answer I am about to give it is not a determination I myself have made, it is a determination based on the terminology used in the industry that Exhibit D-114 would be considered a single casting with particular inserts in the casting. In some cases the inserts may be valve seats, valve seat guides, a cylinder liner, a bearing bushing. But these last parts that I have mentioned would be considered inserts and would
478 still not cause the main member to be considered other than a single casting. Upon examination it appears that the casting itself was formed around the cylinder liner, which is a practice accomplished by several manufacturers. McCullough Motors made it on one of their high production die-casting units. It is quite common, it is not a rarity.

Page of Transcript

Q. Would that liner be an integral part of the casting?

A. Well, it would be rather difficult to extricate without damaging the aluminum housing.

Q. Then you consider it one and the same?

A. Yes sir.

HAROLD E. BRUNS

Direct Examination

480 Exhibit 38 and its components 38-A, 38-B, 38-C, and 38-D, is an engine that was produced by the Lauson Motor Company while I was connected with that company. That was produced after the Lauson Power Head
482 and Sport King. 37-A and 37-B are Lauson products.
483 And they are the mainstay of the business today of the Lauson Engine Company. They are being produced concurrently with the Model RSV 800, Exhibit 38.

Cross-Examination

The Lauson Division started to make the RSV 800 engine, Exhibit 38, in 1951. At that time we had discontinued manufacturing the Sport King engine. We were not tooled up for large-scale or mass production of the Sport King and Power Head engines which are here as defendant's Exhibits 78 and -9. We proceeded to the RSV 800 particularly as a vertical shaft engine because we were quite adequately tooled on that particular iron engine. And that was the reason we proceeded to
487 manufacture that Exhibit 38.

In the Lauson engine plaintiff's Exhibit 37, we use a cast-iron liner in this cylinder.

Q. So that your crankcase and cylinder is not a single casting, is it?

A. That's right.

Page of Transcript

485 Q. I show you a piece which has been identified as defendant's Exhibit D-79, you I think testified previously that this is the oil reservoir base plate for the power head engine.

A. Yes.

Q. Do you find that counterpart of this circular boss in that base plate?

A. Yes, there is a similar boss there through which the crankshaft passes in this plate.

That boss has a couple of functions. One function was to keep the oil which was in the reservoir from running out along the shaft. In other words, the boss is
486 substantially the same height as the oil filler plug, and the secondary function is it carried a cage for the oil seal on the crankshaft. This cylindrical boss that sticks up from the bottom of this plate 37-B completes those two functions also.

Now, in the Sport King and power head, this crankcase and cylinder was a single cast-iron casting in the single piece casting. Whereas in the light weight version there we have aluminum die casting incorporating a separate cylinder sleeve casting of cast iron.

At the present time we do not manufacture any other plates than 37-B, such as shown here, that fit onto the bottom of this main casting.

---

487 HUGH S. BROWN

Direct Examination

I am the same Hugh S. Brown who testified in this action. I read the deposition given by Mr. Harold E. Bruns, and that portion of his testimony that has to do with the conferences held in Milwaukee, December 10,

Page of Transcript

488 1954. It was held at the request of Mr. Holtzman, who is president of the Hart-Carter Company, who owns and controls it, at New Holstein, Wisconsin — or at least they did at that time. Present at the conference were Mr. Holzman of Hart-Carter, Mr. Bruns of Lauson, Mr. Coughlin of Briggs & Stratton, E. B. Oehler of Briggs
489 & Stratton, Mr. Ira Milton Jones, and myself H. S. Brown. And this Mr. Bruns I have mentioned is the one that just left the stand.

At that conference Mr. Holzman sought a license under the Lechtenberg patents herein at suit, and a royalty fee was arrived at. Also at that conference it was brought out that the Lauson Company had some patents that were in the patent office at that time, and also some patents that had already been issued, that he thought would be of value to the Briggs & Stratton Corporation. And said that he would send us those patents so we could look them over and see whether they could be used to partially reduce the royalty. We received those patents after the conference, through Mr. Jones, and they were studied and examined several times. After — this went on for I don't know just how long, probably two or three months, and then in view of the present litigation all of that matter was held in abeyance. It was the decision of several people to hold it in abeyance and people that attended the conference.

490 *Cross Examination*

Mr. Holzman called — I believe called Mr. Jones in Peoria, and that is the way this meeting was arranged.

Mr. Jones: So there will be no question, I had sent the Lauson Company a notice of infringement

Page of Transcript

as I had also sent a similar notice to the Clinton Company, and that precipitated the conference.

We will concede [Briggs & Stratton] are much larger than Lauson.

491 *The Witness:* I wouldn't want to say we dominate the small engine field. I know of no one in our field that out-sells us.

Mr. Jones: We will admit that, Your Honor.

Q. You have held that enviable position for a good many years, even before the advent of the Lechtenberg patent?

A. I would say so.

We have been a leader for a long time, I couldn't say how long. Lauson was a comparatively small company at that time.

Lauson did not have counsel at that meeting. We had our counsel present. There was an agreement arrived at on the —. No, it was not finalized, if you mean that a contract was drawn and all of that, I wouldn't say it was finalized. We settled on the amount of the
494 royalty. When you are talking of the legal I don't know what you mean by contracts. I would say that the royalty or amount of the royalty was stated, Mr. Raisch Now, what that means other than that I cannot say.

Q. In other words, there was no binding agreement ever made whereby Lauson bought a license under the Lechtenberg patent in suit?

A. I don't know what you mean by binding agreement. To me that means a contract written, signed and sealed.

Page of Transcript

Q. Was there any signed?

A. No, there were no contracts written and signed.

And Lauson is not paying Briggs & Stratton any royalty on the Lechtenberg patent.

Q. What was the name of the Briggs of Briggs & Stratton, how did they get the name Briggs & Stratton?

A. It was Mr. Steven Briggs. He is still alive.

495 Q. Is he a stockholder of Briggs & Stratton?

A. I am not sure at the present time, but if he is it is a very small number of shares.

Q. Are his family or relatives stockholders?

A. I woudn't know for sure, but I believe they are.

Q. I was informed that the Briggs family own about twelve percent of the Briggs & Stratton.

A. Oh no.

Mr. Jones: Nothing like that, I can assure you.

Q. What is Mr. Briggs present job with the company?

A. He has no relation with the Briggs & Stratton.

Q. What is his present job?

A. He is Chairman of the Board of Outboard Marine Manufacturing Company.

Q. And a large stockholder, isn't he, too?

A. I imagine so, I don't know that for a fact.

Mr. Conover, of the Conover patent, is Chief Engineer
496 of the Outboard Marine Company. I had occasion to talk with Mr. Conover recently about the patent that was brought up here this morning, I don't remember the number.

Redirect Examination

Q. In other words, when this conference with Mr. Holzman and Mr. Bruns was concluded we left those gentlemen agreeing to a contract, isn't that right?

A. That's the way I understood it.

---

498 DEPOSITION OF WARREN C. CONOVER

Direct Examination

Name, Warren C. Conover; age, forty-four; residence, Waukegan, Illinois. Occupation, Chief Engineer, Outboard Marine & Manufacturing Company. Chief Engineer of Outboard Marine about six years. I have been
499 with Outboard Marine since the corporation was formed in 1936. I was Chief Engineer of Johnson Motors from 1936 until becoming Chief Engineer of Outboard Marine. My experience has been with the engineering of outboard engines all during that time. Johnson Motors was a Division of Outboard Marine.

I am the patentee of the patent to W. C. Conover, No. 2,227,247, which has been marked for identification as Conover, Exhibit No. 1. That patent relates to two-
500 cycle outboard engines, water cooled. The production method contemplated for the engine shown in this patent was die cast aluminum. At the time that I filed my application for this patent, I knew of two-cycle engines which had been die cast. I did not know of any water-cooled, two-cycle engine which had been die cast. The
501 beginning of the work was all with a single cylinder engine. The two-cylinder engine came later. We were interested in commercializing both. Figures 17 and 18 of the patent show a single cylinder engine.

Page of Transcript

The engine shown in Figures 17 and 18 was never actually constructed. In the process of preliminary design work on a die cast engine, several free-hand pencil sketches were made showing possible uses and applications of the die cast principles to two-cycle outboard engines. The Figures 17 and 18 represent one of those sketches. This design was not pursued to any extent. It
502 was not developed beyond the stage shown in the patent. It was set aside and another design was selected for production use, as represented on Sheet 3 and Sheet 4 of the patent. The information supplied to my patent attorney that evolved into Figures 17 and 18 of the patent, it is my recollection, was supplied in much the same form as shown in the patent. Figures 17 and 18 would need considerable development before it would be a workable engine, as some of the principal parts have been omitted. Among these parts would be the carburetor. All sketches of this type usually require additional development before they would make a satisfactory engine. The other figures in the patent, other than 17 and 18, were workable engines, and were produced in production quan-
503 tities. The figures 17 and 18 are incomplete as far as showing details of construction, and therefore probably could not be cast exactly as it is shown. Additional development would be required to insure that it could be cast.

We were in the business of making four-cycle engines up until 1946. By "We", I mean Johnson Motor Division of Outboard Marine and Manufacturing. And that was during the period that I was their Chief Engineer.

As to the comparative problems involved in the design of two-cycle and four-cycle engines, they have quite dif-
504 ferent problems. The four-cycle engine has a valving

problem, oil in the crankcase, both of which are absent in two-cycle engines. Both types of engines present certain design problems which are peculiar to themselves.

Cross Examination

In 1939 and in 1940, when my Patent No. 2,227,247 was being processed, my Company was making four-cycle engines; it was also making two-cycle engines at the time. My Company discontinued the manufacture of four-cycle engines in 1946. Since that time (1946) my Company has not produced four-cycle engines, as a complete engine. We still make parts for service of the engines that were made previous to that time. The four-cycle engines that the Company produced were general purpose engines, for applications up to 1½ H.P., such as washing machines, scooters, generators, miscellaneous applications for small industrial power units. The two-cycle engines that our Company made at the time we were making the four-cycle engines were entirely for outboard motors. And since we have discontinued the manufacture of the four-cycle engines, we manufacture two-cycle engines for lawn mowers, and principally in this country. In Canada we have a two-cycle engine that is used for washing machines and other industrial applications. The two-cycle engines that our Company makes for lawn mowers are used for rotary lawn mowers in this country. In Canada we do make some for reel mowers.

Q. Now, if I understood you correctly, you did say that your Company had produced some of the engines which are disclosed in your Patent No. 2,227,247, particularly those on pages 3 and 4; is that correct?

A. It goes beyond that. We produced the engine shown on Sheets 1, 2, 3, and 4.

Page of Transcript

Q. Beginning when were those engines produced by your Company? Would it have been before the War or since the War?

A. Yes, it's prior to the War.

Q. Are you still producing any of these engines?

A. Not in the same form they are now. They have been redesigned.

Q. Were those engines produced in any substantial quantities at that time; that is, before the War?

A. Yes.

• • • •

508 Q. Do you know why it was that your Company discontinued the manufacture of four-cycle engines in 1946?

A. I'm not well acquainted with the management decisions in this case, but it is my understanding that the competitive situation left too small a margin of profit.

Q. For the four-cycle engine?

A. Yes.

Q. So the company concentrated its activities then on the two-cycle engine; is that right?

A. That's right.

Q. Do you have any opinion on the merits of a two-cycle versus a four-cycle engine for use on rotary lawn motors?

A. The answer would be yes.

Q. Would you care to express your opinion.

A. It gets highly technical, and it would take considerable time to cover it.

509 Q. Well, I don't think we need a technical discussion. I think the question could be answered, if you wished

age of
ranscript

to answer it, by a rather brief statement as to whether you consider that a two-cycle engine may or may not be as desirable as a four-cycle engine for use on rotary lawn motors.

A. Well, I think that the two-cycle engine is superior to the four-cycle engine for rotary lawn mower applications.

* * * *

511 Q. In your testimony about Figures 17 and 18 of your patent, you stated, I believe, that the drawings there shown were incomplete. Did you intend to leave the impression that the structure disclosed in Figures 17 and 18 was inoperative?

A. Yes. Yes, the sketch as shown would be inoperative.

As it is shown in the sketch, it would be completely inoperative and unworkable. It had never been developed. To take a rough idea of this kind and reduce it to practice and make it operative would take more development, additional work, than has been put on this preliminary
512 sketch. It has never been reduced to practice, if that clarifies the point. I didn't say it would be unworkable design. As shown it would be inoperative.

Q. Because it is incomplete?

A. Incomplete, that's right.

Q. Now would there be anything more involved in completing that engine than the skill of a good engineer?

A. That covers a lot of ground.

Q. Well, you have disclosed this Figure 17 and 18 in your patent. Would you as an engineer say that you could not complete the design of that engine and produce it?

Page of Transcript

A. I don't believe I could answer that question without actually going through it, performing that operation. Many sketches present ideas that might look fine in the beginning and, as you develop them, present problems that are not solved.

Q. You can see a lot of problems to this Figure 17 and 18 now?

A. It appears to be.

* * * * *

515 A two-cycle engine has quite a different kind of a valve than you have in a four-cycle engine. Some two-cycle engines use other kinds of valve arrangements for controlling the flow of gas into and out of the cylinder than the kind I have just referred to.

Q. So in talking about valving problems in connection with a four-cycle engine, you didn't intend to leave the impression that there were no valving problems in a two-cycle engine, but rather, if I understand you correctly, that different kind of valves are employed, and the problems are different; is that right?

A. I think that was pretty much covered in my original answer.

516 The problem is different in both two-cycle and four-cycle. The valves that go in a four-cycle engine present a problem, and the two-cycle engine does not have the same kind of valves.

Q. I understand that, but when you talk about a valving problem, you are talking about two different things. Are you saying that the valving of a two-cycle engine is no problem at all?

A. Very slight as compared to four-cycle.

* * * * *

Page of Transcript

517 Q. Were the two-cycle engines that your Company produced for use on rotary lawn mowers made by die casting techniques, with particular reference to the main housing parts?

A. The engine is die cast.

• • • •

518 Q. I was talking about two-cycle engines for use on rotary lawn mowers since 1946.

A. Yes, they were all die cast.

Mr. S. F. Briggs is the Chairman of the Board of my Company. I personally know of no business relations with Briggs & Stratton. If there are, it's beyond my knowledge. There are no patent license agreements between the two companies that I am acquainted with.

519 I have no knowledge of a two-cycle engine of Briggs & Stratton.

Q. Were you subpoenaed to testify in connection with this matter?

A. No.

Q. You appeared voluntarily; is that right?

A. That's right.

JOSEPH ROBERT HARKNESS

Direct Examination

I am the same Mr. Harkness who testified previously in this case.

This object which has been marked for identification
520 as plaintiff's Exhibit 39 is a model of the Vansickle engine which has been referred to here a number of times. I supervised its construction. And it was made under my direct supervision.

Page of Transcript

I first had the drawings of the Vansickle patent figures enlarged to give a bore of 4 inches, and then took the enlarged prints to a model maker and then he constructed the model directly from the prints. Those were photographic enlargements from the actual patent drawings. I knew that engines of the period of the Vansickle design were quite large. They were large in area to produce any sizeable power at the low speeds involved or used at that time. However, I didn't wish to make the model
521 so large that it would be unwieldy and difficult to bring here. Therefore, I settled on four inches as a reasonable compromise between the probable size of the engine and something we could use here. It so happened that after the figures were enlarged to give the four inch bore, in checking the size, for example the cylinder of the engine, the crank pin and main bearings, I determined that would get it on even fractions of an inch, indicating that the original size of the engine was either the size shown here or some multiple of it.

I did estimate very roughly what the horsepower of a Vansickle engine of this size would be. I arrived at an answer of approximately two horsepower. That horsepower is of the same order as the horsepower of the Briggs & Stratton Lechtenberg engine of the type involved in this suit and which is exemplified by plaintiff's
522 Exhibit 36. Exhibit No. 36 is our Model 6 engine, which is rated at two horsepower.

• • • •

524 In order to keep the model relatively simple the water passages were not cored in the model, nor were the rings made on the pistons. Also the governor mechanism, the fuel pump mechanism, which would have been over here, at the flywheel side of the crankcase. Also the intake or

scavenging head coring in the large diameter section of the cylinder was not cored. I now remove cylinder head 18, in which the water cooling coring 34 was not produced. Completing the engine there, rotating the crankshaft the motion of the piston can be observed.

525 The wall of the crankcase on the side opposite from the flywheel in this model is made up of the cover, part 15 of sheet 1, and also an inwardly projecting flange, which is part of the main crankcase and cylinder casting. This flange can be observed in that view which hides my hand when my hand is put inside the crankcase. The parting line between the removed element 15 of the patent and the remainder of the crankcase wall is not actually a parting line, but it is a complex parting surface and can be seen on the cover 15. The parting is made up of a plain surface and a cylindrical surface, both of which are in conjunction or in contact with each other when the cover is installed on the engine.

Cross Examination

527 I was first interested in gasoline engines as soon as I was aware of them. Approximately thirty years ago. The size of engines for practical horsepower has continually decreased during that period. I attribute that continuous decrease in size of engines for the same horsepower to many factors. Well, rotational speed, high-compression ratios, better fuels, better combustion chamber shapes,
528 high-compression pressure, better scavenging, better lubrication. Better alloys from the strength standpoint. In other words, there are a lot of advances that have been made in the metals and fuels and allied fields that are taken advantage of today and were taken advantage of by Lechtenberg when he made the patent in suit.

Page of Transcript

This portion of the model Exhibit 39, which is shown in the drawing as No. 15, is a cover.

Q. You also admit it is a bearing for the power take-
529 off end of the crankshaft?

A. I admit it has a bearing.

Q. But you don't admit this is the power take-off end?

A. I couldn't confirm it.

Q. Have you—will you look at Fig. 1 of the—of the drawing of Vansickle. On the right hand side you will notice a jagged line that designates that the shaft is cut off, doesn't it?

A. Or broken off, yes.

* * * *

When you have a broken line at the end of a shaft that means that some part has been left off, perhaps a flywheel or extension shaft or something of that type has been left off. I wouldn't conclude from that that was the power take-off end of the shaft.

Q. You wouldn't? What would you think would be the purpose of having that shaft sticking away out here—to that extent your model is not faithful, is it, its end of the shaft is not broken, it is finished to indicate an end, isn't it?

530 A. That is correct.

Q. We don't know how far this shaft extends out, do we?

A. No, we do not.

Q. Now, why do you have any question in your mind this is the power take-off end of that shaft?

A. Well, at the time that these engines were used much of the power take-off from the engine was by a

Page of Transcript

flat belt around the flywheel. In which case I would say that the flywheel shown here may very well have been the power take-off end of the shaft.

Q. The patent doesn't say so, does it?

A. I don't recall it, no.

Q. Would you look at it or take my word for it that it doesn't, or you can have your counsel advise you and we will proceed.

Mr. Jones: My recollection is the patent is silent as to the power take-off end of the shaft.

Q. That's right, your statement that the power take-off is at the flywheel is speculative.

A. Did I say it was or could be; I am not sure.

Q. When you say could be, that is purely speculative?

A. No, it isn't, it might have been.

Q. But the patent does not say so. Will you say why
531 they would want to extend that shaft on further, as indicated by the broken line in the drawing?

A. Perhaps for a water pump, to take care of the cooling agent.

I would consider the pump a normal operating part of the engine. The power supplied by the bottom of the piston in drawing gas into the crankcase is a normal requirement of the engine.

532 I will admit that power might have been taken off of the non-flywheel end of the shaft.

Q. Now, if you take this flywheel off, can you pull out the shaft?

A. You would have to also remove the connecting rod.

Page of Transcript

You can reach the connecting rod through this opening in this wall.

This model represents the cylinder and the crankcase except for the cover here, No. 15 in that patent, as a single casting.

The purpose of this base with four holes is to mount it on a pedestal, for example, fasten it down to whatever supports it. That is the same function as this base des-
533 ignated 32, the four holes in the bottom of the Briggs & Stratton engine which is Exhibit 36. In other words, except for size this base on the model here with the four holes in it is comparable to the base with the four holes in it in this Exhibit 36.

Q. Now, you talked about the parting line. This cover certainly has a parting line connection with the opening in the base—in the side wall of the crankshaft, doesn't it?

A. No, as a solid body they have a parting surface.

A parting line as shown on a drawing is actually a line because the drawing is two-dimensional. A drawing is a two-dimensional elevation usually of a three-dimensional object. And as such a plane is generally shown as a line on that part, consequently it is commonly
534 called a parting line, because it is a line.

This crankcase cover here, 15, parts from the crankcase casting. And this portion, which is the round portion, cylindrical portion, that is coaxial with the crankshaft — that makes a surface contact with the inside of this opening in the side wall of the crankcase. So there is a parting surface between the cover plate and this crankcase.

Page of Transcript

Q. Now, if this element 15 is not the cover to cover this hole through which you may remove the crankshaft, what would you characterize this as?

A. I characterize it as a cover.

And the cover has a bearing in it which supports one end of the crankshaft. Then my position is, this is a cover in what might become the power take-off end of the crankcase but does not complete the wall of that crankcase. • • • •

537 *The Court:* • • • The Vansickle patent is more than a half century old, we are trying to bring something forward nearly sixty years, which presents a good many problems.

---

538 ERNEST A. LONGENECKER

Direct Examination

Ernest A Longenecker, age 60. 411 South Higby Street, Jackson, Michigan. Occupation industrial consultant. Graduate engineer, mechanical engineer from the University of Wisconsin with a BS degree. Postgraduate work credits in engine design and industrial engineering. 1917 to 1919, United States Army. Engine mechanic in the Aviation Section, Signal Corps, which later became the Air Corps. I went in as an enlisted man, final rank of Major. I was in the Army from 1917 to 1919, then I was in the Organized Reserve after that. And at all times primarily concerned with engines and aircraft. Following graduation I taught Thermodynamics at the University of Wisconsin. That deals with heat, power engineering, engine design, and utilization of heat as fuel for operating the prime mover. Following that I worked with the Assistant Chief of Tool Designing for Fairbanks Morse & Company at Beloit, Wis-

consin, who manufacture a complete line of industrial and marine diesel engines, and who at that time manufactured a line of industrial and farm gasoline engines. I left Fairbanks Morse in 1926. For two years I was plant superintendent for the American Lacepaper Company in Milwaukee. Following that I was Foreman of the assembling and tests for Leroi Company who manufactured a complete line of small—down to six horse—and large gasoline engines, and a line of air compressors.
541 Following that for seven years I was Industrial Engineer for the Charles A. Krause Milling Company. Following that from late '39 until about sometime in December of '47 I was President of the Lauson Company at New Holstein, Wisconsin, going there as Executive Vice President and becoming President shortly thereafter. That is the Lauson Company at New Holstein that manufactures gasoline engines. I went from Lauson to Leroi Company where I had formerly been employed, this time as President and General Manager of their Milwaukee plant. Their plant in Cleveland, Ohio, makes air tools, and their plant in Cambridge, Ohio, make tractors. I was there until 1950, July. For a period of about a year I was Industrial Consultant. One of the accounts I was serving at that time was the Jacobson Manufacturing Company at Racine, Wisconsin. In August, 1951, they asked me to become
542 their Plant Manager. I was Plant Manager there until about the middle of '53. Jacobson manufactures a rather complete line of power lawn mowers, and in making this line of mowers they build their own two-cycle engines. At the time I went there it was primarily for the purpose of developing a four-cycle air-cooled engine to complement their line. I left Jacobson and went to Yardman — Yardman makes a complete line of hand and

Page of Transcript

power lawn mowers and is located in Jackson, Michigan. I was there until December of 1954-'55.

543 Q. Now, you testified you were the President of Lauson at the time which these engines Exhibit 33-A, 33-B, 34-A and 34-B were being made there, is that correct?

A. That is correct.

There was a very great demand for a light weight four-cycle engine during World War II. During that period
544 we at Lauson made quite a few thousand engines with cast aluminum crankcases and cylinders for the Air Corps, the Chemical Warfare, and some of the other services. Those were sand cast. Four-cycle. Among the exhibits before me the cylinder and crankcase casting on Plaintiff's Exhibit 38 is similar to the aluminum wartime engine that was made by Lauson, about which I just testified. It was similar in respect to its body casting.
545 At that time most of them were sand cast aluminum. It might have been possible to die cast the cylinder and crankcase body of that light weight aluminum engine that Lauson made during World War II. I think it could have been done. There would have to have been
546 design changes. I don't believe they would have been too difficult to make. Those were very much more expensive than the sand cast [iron] engines. There was a high rate of scrap. And the price was in the neighborhood of two and a half to three times as great as the standard engine. About $76.

Following the war we were able to sell our entire production and at somewhat greater prices usually than competition. Part of the reasons we used in selling to our customers that we were charging additional prices

Page of Transcript

was light weight, castings were lighter than competition for the power developed.

Q. About how much lighter?

A. As I recall, without checking, it was the difference of between 28 pounds and 34 to 35 pounds.

Q. Rather small amount then?

A. Yes, it is important though in certain applications.

Q. Now, during his deposition at New Holstein, Mr.
547 Bruns testified that it would have been possible to die cast the cylinder-crankcase body of the Sport King outboard engine—and that is the engine of which plaintiff's Exhibit 34-A is a specimen—that it would have been possible to die cast this cylinder-crankcase body plaintiff's Exhibit 34-A.

* * * *

A. Yes, I think it could have been done. It would have presented the same problems such as loose cores on the interior and possibly trouble around the port. It would have been more expensive than to have made it the way we made it, I think it would have cost more, the production cycle would have been slowed down.

548 The designing of the Sport King was partly completed when I went to Lauson, but no production models had been made. We did get the engine into production early in 1940 in limited quantities, and in greater quantities in the following years.

549 Q. Now, just how closely similar was this wartime aluminum engine of Lauson's to the cylinder and crankcase body of the engine Plaintiff's Exhibit 38?

A. As far as the cylinder and crankcase is concerned the layman wouldn't be able to distinguish the difference without close examination.

Page of Transcript

It would have been very much easier to die cast that wartime aluminum engine, similar to Plaintiff's Exhibit 38, so far as the cylinder and crankcase body is concerned, than the Sport King engine. The bearing plate and the sump of the Sport King engine was not made in one piece; it was made in two pieces because that was the only way we knew to make it so we could remove it. See, the oil pump and the pump plunger—the barrel and plunger lay in the cavity between the bearing journal plate and the oil sump. The oil sump is the portion designated as plaintiff's Exhibit 34-B. And the bearing
550 retainer plate is attached to the crankcase Plaintiff's Exhibit 34-A.

Q. Now, would you like to have been able to make those two parts, the bearing retainer plate and the sump, in one piece?

A. It would have been wonderful because we would have been able to save forty-five to fifty cents if we had been able to do that.

The bearing supporting plate on the Sport King engine (again referring to plaintiff's Exhibit 34-A) performs a dual function. It carries the bearing for the camshaft and also the bearing for the crankshaft. It also completes the reservoir which holds the oil when the engine or outboard is laid on its side, as would be done in transporting. The oil was not retained in the crankcase portion of this engine. After being pumped up to the engine it drains back down into the oil sump, that portion plaintiff's Exhibit 34-B. That was a very special
551 arrangement made in order to adapt the four-cycle for outboard use.

Page of Transcript

Q. Now, could that engine have been used as a horizontal shaft engine? And by that engine I am referring to the Lauson Sport King.

A. Very definitely not.

Q. Why are you so definite?

A. Had we had that in mind it would have been designed entirely different. In fact I could not conceive of a design any worse than that design for use as a horizontal shaft engine.

The reason is that the engine as it is designed has a very compact crankcase and the oil is all carried outside of that crankcase in a position which could very easily have resulted in stripping the engine of oil after it runs and goes back into the crankcase. You would eventually get no oil and the oil pump would not dip down in the horizontal position to make it possible to lubricate that. This discussion is all with reference to running the Sport King in the horizontal crankshaft position.

552 I was with Lauson at the time this Power Head engine was put into production. A man by the name of Belden, as I remember, was looking for a four-cycle engine to use on a rotary lawn mower which he had designed. He was looking for an engine where he could have the crankshaft vertical, and this was the closest thing he could find to that. And it had a somewhat streamlined appearance, so he persuaded us to sell him some engines.

Q. What do you mean, he persuaded us?

A. Well, this engine as originally made had no governor, and the first ones that we sold were without a governor and also without very much of a guarantee, because we explained it would be possible for a person

Page of Transcript

to overspeed the engine, and that did happen after a short time, and we did finally work out an air vane governor which was put into the job for the rest of the engines we sold for that purpose.

Q. Why was he so eager to buy this engine in spite of the guarantee?

A. Well, probably couldn't find any engine anywhere
553 else that would seem to meet his requirements.

Mr. Raisch: Do you state that of your own knowledge, Mr. Longenecker, or are you just speculating? I want it to appear in the record.

A. I know of no other engine at the time that had a vertical crankshaft in the four-cycle.

Now, after the Sport King and the Power Head engine had been put into production by Lauson—I don't recall whether this was just before the war or just afterwards—we made some vertical shaft engines, using the crankcase on plaintiff's Exhibit 38, for a rotary lawn mower application. Also during the war we designed a completely new engine, about three horsepower, for a military application; this one also in aluminum and following the same conventional design as in this Exhibit 38.

Q. That is, the engines that you designed after the Sport King were what were considered conventional engines at that time?

A. The conventional Lauson design with the valve
554 on the flywheel side of the engine. We also put into production a three horsepower engine, as I remember, Model TAC, following essentially the same design. About the only difference between the cylinder and

Page of Transcript

crankcase design of those Model TAC engines and that of plaintiff's Exhibit 38 was that in the three horsepower [TAC] there were two separate valves to actuate the cam for the intake and exhaust valves, while in the original design they had one cam which operated the two valves.

A casting is an object which is made by filling a mold with material in a non-solid state, which on hardening changes its structure or composition and reproduces in its dimensions the shape or sizes or contours imposed on it by the mold. And sometimes in addition to the molten or non-solid material that is put into the mold, some sort of solid insert is used.

Q. Now, if that insert becomes a part of the material that was put into the mold in non-solid state, what have you to say as to whether or not the result of the product is a casting?

555 A. Well, if I do it I would like to reduce this to a simple — this whole thing has been very complicated in this discussion. I would like to reduce it to a simple term. My wife at times makes a cake and puts raisins in it, the raisins become an integral part of the cake. When I ask for the cake, I don't say, please give me some cake and some raisins, I say, pass me a piece of cake. I think the same thing applies to a casting. If you have an insert in the casting it becomes part of the casting, it is not a casting and an insert. As regards the value of one kind or the other, some people like cake with raisins, some people like castings with inserts.

Both two-cycle and four-cycle engines burn gases. There are many points of similarity and many points of differences. There have been many textbooks written

on this whole subject. • • • There are some very fundamental differences, and normally the expert in one field does not even attempt to qualify as an expert in
556 the other. In the two-cycle engine they depend on a mixture of oil and the gasoline, and you consider the inside of this room as a cylinder and have somebody outside with a spray gun try to spray through the window, that is the way you oil the cylinder wall. You fill the complete piston chamber with oil and gas mixture in the hope of getting a little bit on the walls. On the four-cycle engine the oil is in the crankcase and the gas is in the gasoline tank. There is another fundamental difference of course between the two- and four-cycle engines, is that the piston on the two-stroke engine delivers the power stroke every time it goes down. At the same time it goes down it compresses a charge of air and fuel in the crankcase below the piston. And as the piston goes far enough down it uncovers a port, which forces this combustible mixture up and over the top of the piston, and at the same time the piston uncovers the port which allows the burning charge, or burned charge, or burned gases to escape. The hope and dream of all two-cycle
557 people is they can get complete discharge of burned gases and complete intake of unburned gas without too much of a mixture. It is a very difficult thing to do.

The problem of residual burned gases in the four-cycle engine is tremendously less severe. The four-cycle engine has a complete movement of the piston forcing the burned gases out through the exhaust valve, and the only gases remaining in the cylinder head is distributed between the cylinder head and the top of the piston.

Page of Transcript

Q. Are the valves in a four-cycle engine anything like the ports in two-cycle engines?

A. They produce —they try to perform the same function but design-wise and the problems connected with them are entirely different.

On the four-cycle engine you have a problem of pushing the burned or burning gasses out past an exhaust valve which becomes incandescent in its operation. There is a very severe problem of valve seats and valves as regards burning, especially there is some of the leaded fuels where deposits of lead accumulate between the valve and the seat and tend to hold the valve open, causing the valve to do what they call wire draw, giving a crevice between the valve and the seat. You have another problem on a certain kind of fuels like some of the synthetic fuels where you doctor them up with lead, where you have an accumulation of gum around the intake valve stem. You have to have a valve of the right size between the stem and the guide to prevent oil from being pulled up the valve stem. At the same time you have another problem of the exhaust valve which runs very dry by lack of lubrication and it runs very hot. The big problem on any four-cycle engine, especially air-cooled, is that little triangular area that lies between the intake and the exhaust valve and the edge of the cylinder bore. That is a spot that is hard to cool. We have run tests on engines where we put a thermocouple lead in that spot and find the temperature at that point will run higher than 990 degrees — above red heat. On the opposite side at the intake valve it might run as low as 180 degrees. Which would mean that the intake valve being unevenly heated does not stay round any more. You have to design to take care of all of these problems.

Page of Transcript

Q. Now, is there any part of the engine which presents peculiar cooling problems in the two-cycle engine,
559 as opposed to the four-cycle engine, or vice versa.

A. The two and four-cycle are entirely different. They have not been too acute on the two-cycle developed motor where they use water, but on the two-cycle air-cooled it is quite a problem because you have a power stroke every time the piston goes down, so in fact you have a burning fire in that cylinder at least half the time. On the four-stroke cycle it is only one-fourth of the time. Also on the two stroke engines you hope that you can keep the heat from running through the piston and igniting the gas under the piston, which has been compressed, because it decreases the volume and torque function of the engine. You don't draw as much charge into the crankcase. In the four stroke cycle you design to provide for a great part of the heat to be carried off by the oil, which splashes against the bottom of the piston or communicates through the rings to the walls. So your cooling problems are entirely different. There is two entirely different types of engines.

Production-wise the two-cycle is tremendously much less expensive to tool up for. Less parts, less inventory,
560 less assembly operations. In fact unless you go to elaborate tooling you can tool a two-cycle engine at the same price as tooling for the crankcase of the four-cycle.

The fact that the two-cycle engine does not have oil as such — it has it in vapor form — makes it possible to use the two-cycle engine in most any position you can get the carburetor to function. That is one reason they use them in chain saws so extensively.

Page of Transcript

In designing any engine you have to provide for carrying off a certain percent of the heat. The reason is, you must keep the temperature of the metal parts where the oil is functioning below the point where the oil will char. With the water-cooling engines it is quite simple to take the heat away through the water. With the air-cooled engine the problem is much more acute, because you have not only the difference in air pressure but you have the difference in the effectiveness of the fan
561 at different speeds. There are certain speeds at which you idle the engine where you don't get the air around where it should go. It has to be more carefully studied out. I have known of poor air-cooled engines which were not successful due to improper spacing of the cylinder bores, and so forth, which by converting to water-cooling was a very successful engine. In other words, you have to space your cylinders, get your air through not only on the side the fan is blowing from but you have to bring it around to the reverse side.

Q. Well, to reverse your answer and put it into the form of my question, I understand that merely because an engine is a good water-cooled engine does not mean it is adapted to air-cooling.

A. No, not whatever.

I made it a practice to buy every text or every book that has been published that came to my knowledge on engines or on the manufacturing of engines. I belong to the American Society of Mechanical — or Automotive Engineers. I attend every meeting where sessions are given, that I can, where topics of interest to me are being discussed. If I can, I get the transactions and

Page of Transcript

read them and study them. I also have read the bound — wherever possible get copies of any patents which may have been issued on engines, carburetors, ignition equipment.

Q. Now, you were with the Lauson Company in 1940, and were you at that time making it a practice to keep up with patents as they issued that related to your field of interest?

A. We bought patents where we could find them.

Q. I show you the patent of W. C. Conover, No. 2,227,247, which issued on December 31, 1940 — Exhibit D-99, and ask you whether you recall seeing a copy of that patent at or about the time it issued?

563 A. No, I don't. It — if I did see it it made no impression on me. I don't recall it.

Q. Do you have any recollection of seeing the patent which is here in suit, Lechtenberg patent 2,693,789, at or about the time it issued?

A. Yes, the patent service I was retaining at Jackson sent me a copy of it just about the time it was issued.

Q. Do you recall getting it at that time?

A. Very shortly after the time of issue, yes.

Q. Did it make some impression on you?

A. I — figuratively kicked myself all around the block for not having realized the implications of that patent because that is a tremendous advance in the art.

Mr. Raisch: Are you qualifying Mr. Longenecker as a patent expert?

Mr. Jones: Oh no.

Page of Transcript

Q. Let me ask you this question: What part of the patent do you look at when you get it from the patent —

A. Look at the structure chart and that idea of putting — having standard tooling and getting a variety of uses. We could have die-cast this engine but I couldn't afford to do it because we had so many different models around Exhibits 33 and 34. No, right here. Exhibit 38.

564 Q. Didn't the Sport King engine teach you — the way that machine was made impress you about this Lechtenberg patent?

A. No, it didn't.

Q. Were you ever approached by Clinton for information or possible help to them in the litigation between Briggs & Stratton and Clinton Machine Company?

A. Yes, I was.

That was early in the year of 1955, or possibly late '54. I think it was January or February, 1955. At that
565 time Mr. Erlacher, Sales Manager of Clinton, called on me and said he was soliciting information that might be of help to them in this litigation. And I told him I had just received a copy of the Lechtenberg patent and didn't know too much about the claims. But that as far as I could see it appeared to be somewhat similar to a Sport King engine that we had made. I told him a lot about the Sport King and the lawnmower power head we had made from the Sport King outboard.

Q. Do you still feel that the Sport King is pretty much like the Lechtenberg patent disclosure?

A. Well, it has an opening on the power take-off side. I think the similarity ceases at that point.

566 *Cross Examination*

From 1922 — 1924 to 1926 I was Superintendent and Chief Tool Designer of Fairbanks Morse. At that time we installed our own die casting department and I designed quite a number of die cast dies used in the ma-
567 chines for making carburetors — or magneto equipment, and similar equipment. Since that time I have been in contact with representatives of die casting companies in discussions with our engineerng department relative to the economies of using die castings that might have been stamped, or fabricated in some other way. So we have had the benefit of their comments and experience in regard to the desirability or non-desirability of using die castings.

Providing you have volume enough and providing you have possibility of designing to get the strength that you require you can get simplified machine operations, greater degree of interchangeability, and so forth, in using die castings. Although die castings per se are not necessarily the answer to every problem. You may want to use stamping, or may want to use sand casting. Each problem has to be weighed on its own merits and the economy computed.

Q. Would you say that die casting has become more popular down through the years?

A. Well, the—stop to think back to what we did a few years ago I think there are other things more popular. In other words, there are more things made and probably a percentage of those are being made by die casting, but
568 — I think that there has been a gain in the art as there has been in every other art.

Die casting procedures and machines have not stood still; neither have any of the other manufacturing tech-

Page of Transcript

niques. Even sand casting I think the progress in knowledge in the various arts has come along simultaneously. I don't think you can say it has all gone to die casting and everything else has stood still. I think you have equal benefit in stamping, and all ways.

Q. Would you say that many things today can be die cast that ten or fifteen years ago could not have been die cast?

A. No, I don't think so. I do think there have been many products today that might be made out of bakelite or some other products they thought they had to die cast a few years ago.

Q. What about die casting with aluminum? That was not a common thing 15 or 20 years ago, was it?

A. Aluminum has had greater use in the last few years.

569 Q. And prior to that time it was mostly zinc base die casting, isn't that correct?

A. Yes sir, quite a bit of zinc.

About 1940, as I recall, there were — they were making some things out of aluminum — like connecting rods in small engines — that prior to that time they thought they had to use either permanent molds or sand casting. I think aluminum die casting came into its own pretty well in the '40s, or early in 1940. The benefit in die casting a cylinder block rather than sand casting depends on the volume.

Q. In the ultimate product is die casting a cylinder block any better than sand casting a cylinder block?

A. From a utility standpoint?

Page of Transcript

Q. Yes, forgetting the thing produced and getting it into use.

A. Weight-wise it might be a little advantage, otherwise it is about a standoff.

570 Q. You mentioned I believe that you could die cast the cylinder and crankcase of the Sport King engine. When you mentioned that did you mean die casting of aluminum?

A. It could be die casting — it wouldn't be too good a job with the sections they have there.

Q. You did not sand cast Sport King cylinder castings out of aluminum?

A. It could be done.

Q. Any more difficult than sand casting it out of iron?

A. Oh yes.

Q. It is possible, and would have been possible back prior to 1950, wouldn't it?

A. Yes, we made a good many engines with sand cast aluminum. We charged $76 for them as compared to about thirty-four. We didn't do that because we wanted to hold the government up.

Q. Coming over to the Power Head here, you testified here I believe correctly — if I misquote you I don't do it intentionally. That this plate here, which is the
571 bearing plate, and this plate, which is Exhibit D-79, could not have been made in one piece — could not be made in one piece.

A. It could be made, but it could not be assembled.

• • • •

Page of Transcript

The reason is that the oil pump barrel and the oil pump flange right below the bearing plate engage a fixed pin on the bearing plate, and an extension of the camshaft.

Q. All right, that was due to a special lubricating pump then, wasn't it? Do I understand you correctly it was due to the special design of the lubrication pump, for that reason you could not have assembled the bearing plate and the reservoir D-79 in one piece?

A. Because of your pump being held up in there from below, yes.

Q. Yes, why did you use that kind of a pump? Did this engine require that kind of a pump? You are an expert in this field. Couldn't you use another type of pump or lubrication in this engine?

A. In the space allowed it is about the only pump that would work the best.

572 Q. But it would have been desirable to design another pump or lubrication system?

A. I don't think it would have been as practical a lubricating pattern or value as this one.

Q. No, but it would have been possible to design another lubricating system?

A. Not as desirable. This takes oil through the camshaft and spreads it through a little hole in the camshaft into the working parts of the engine. We tried on this engine here to do what you are talking about. We clamped a vane on the pump for a fellow by the name of Tom Goodall who used a lot of vertical shaft en-

Page of Transcript

gines. Mr. Bosma was very much upset about it, and he disturbed me no end by taking one of these out and proceeding to burn it up because this slinger didn't throw the oil up there. Then we went to a different type of engine with different gears, but that didn't do it. It was not possible to make a closed cavity and do it.

Mr. Jones: Will you identify the Exhibits?

A. In this other type, you mean —

Mr. Jones: Cover 38-C. Cover 38-C and the oil sump on the one below there.

Q. 38-D.

A. — are two separate parts. Definitely I thought — after I left Lauson, we were working on it at that time,
573 we would have made a one-piece job there if it could have been done.

• • • •

Redirect Examination

589 Forgetting about the oil pump now, on this Sports King engine, which is exemplified by Exhibits 34-A and 34-B, you could not have fully and completely fastened down onto the cylinder-crankcase casting this bearing retaining plate if that bearing retaining plate had first been fastened to the sump Exhibit 34-B. Not on the present construction. You might have altered the construction to have mounted something like that possibly, but as it is presently constituted the plate has to be screwed against the crankcase first to hold part of the plate down, and then after that it is screwed to the sump by means of studs.

Page of Transcript

590 **CLARENCE DAMON**

Direct Examination

Defendant's Exhibit D-100 is a Clinton 700 horizontal shaft engine. It is Model B 701. The aluminum mech-
591 anism on the end of the defendant's Exhibit 100 is a similar mechanism to plaintiff's Exhibit 36-B which is attached thereon. Now, this is a speed reducer. The
592 housing of that speed reducer is mounted on the mounting pad which is part of the cylinder crankcase casting. In the same position — or the same surfaces used for adapting it to vertical shaft when the engine is tipped in the other direction, or for application of generators, pumps, and the like. Now, in order to use that speed
593 reducer on the horizontal 700 shaft engine, there are no changes required in the basic engines but the extension of the end of the crankshaft — the end of the crankshaft of the engine either is provided with a diameter suitable for the small gear or has a gear cut on it. So the crankshafts are different. There are no parts that would be different so far as the engine is concerned. So in order to use the speed reducer on the 700 horizontal shaft
594 engine, you use a special crankshaft which is appropriately formed to drive the gears of the speed reducer. There are three reducer speeds, the 2 to 1, 4 to 1, 6 to 1, which entail a different gear here and one different gear on the crankshaft. And then this speed reducer may be mounted in four different positions on the crankcase. In 1950 Clinton was manufacturing and selling a horizontal shaft engine with a speed reducer on the mounting I have just identified, assembled thereon.

595 HAROLD E. BRUNS

Direct Examination

596 I heard Mr. Hugh Brown's testimony regarding a conference that was had between some of the people from Lauson and some of those from Briggs regarding the Lechtenberg patent. I recall attending that conference. At that conference I represented Lauson. Mr. W. A. Holzman, President of Hart-Carter Company, accompanied me for Lauson. Lauson Company did not have an attorney or counsel present at that meeting. The meeting was I believe partially the result of a letter that we received from Briggs & Stratton contending that Lauson was infringing in connection with the Lechtenberg patent here in suit. Present at that meeting on behalf of Briggs & Stratton were Mr. Coughlin, Mr. Oehler, Mr. Brown and Mr. Jones.

597 The meeting had a very friendly tone about it. It started out in general discussion. As I recall Mr. Coughlin indicated that he did not want in any way to spoil the good relations that have existed in the past between Lauson and Briggs. It was an exploratory meeting as far as Lauson people were concerned. We had received this letter or notice. We were a very small company, and we were approaching the largest company in the business. We were exploring the possibility of the cost of litigation as against a royalty arrangement. However, at that meeting Mr. Holzman clearly indicated we felt we had prior art. By prior art I mean defense against the patent. We indicated and told that to Briggs & Stratton.

Q. Now, was any agreement ever reached at that conference?

A. No, not an agreement. Several subjects normally concerned with licensing arrangements were discussed,

Page of Transcript

and several phases of it, but no agreement was reached nor signed nor drawn up.

Q. And did you understand from that meeting that Briggs & Stratton were going to bring a suit against
598 Lauson?

A. No, in fact just as we were leaving, the Briggs people took us for luncheon, Mr. Coughlin said as his last words, let's just let this matter drop for a while and see what happens.

CLETUS V. ERLACHER

Direct Examination

I have previously testified in this case. I heard Mr. Longenecker testify about a meeting with me in the early part of last year. I recall that meeting. During the time
599 that Mr. Longenecker was President of the Yardman, Incorporated, in Jackson, Michigan, I recall calling on Yardman two or three times at which I did have meetings at least twice with Mr. Longenecker. Yardman is in the manufacturing of power lawnmowers for principally Sears Roebuck and Company of Chicago, Illinois. Not being prepared prior to being in this courtroom this afternoon, I could not identify or establish the exact date of these meetings that I had with Mr. Longenecker, particularly the one about which he testified. The approximate date given by Mr. Longenecker may be correct.

600 My occasions for all visits at Yardman in each and every instance was primarily for the purpose of obtaining business from the Yardman in the form of orders for Clinton engines. Never have I made a visit to Mr.

Page of Transcript

Longenecker personally for any other primary purpose than that.

The suit between Briggs & Stratton and Clinton was mentioned during the visit with Mr. Longenecker. I did ask, because he had been president of the Lauson Engine Company, for any assistance that he felt he could extend in our behalf. He gave us no such assistance or indication he had anything one way or the other of material benefit to us. We did request if he did come by any of that information we would appreciate his making it available to us. I personally have never heard further from
601 Mr. Longenecker.

ERNEST A. LONGENECKER

• • • •

603 *Cross-Examination*

Q. Did you thoroughly describe the Sport King or Power Head engine to Mr. Erlacher?

A. No, I didn't — either the pictures or get literature on it. I said we made such an engine that opened on the bottom, and we had made some Power Heads, using that name.

Q. You were using no definite questions —

A. Not necessarily definite questions, I called these things here all a matter of office records. If the record would establish one thing, fine. I didn't know at the time anything about this Lechtenberg, except the picture showed the crankcase opened at the bottom.

Q. You didn't make it clear to him then, did you that
604 that Sport King — did you call it Sport King?

A. I said we made an outboard King out there.

Page of Transcript

Q. Did you make it clear to him that engine would be a defense against the Lechtenberg patent?

A. I thought I did, but apparently I didn't. It was my — my intention so to make it clear to him there was such an engine, that they should investigate it.

Q. — It would be a good defense?

• • • •

A. — I didn't say it would be a good defense, I said there was such an engine made and it should be investigated.

Q. At that time you thought it was a good defense?

A. I didn't know. I looked at it, I didn't have a chance to study it. After I studied it I realized the implication of this Lechtenberg job, but it was just a few days after I received it.

I didn't give him any literature. I didn't take him out and show him my lawnmower.

FINDINGS OF FACT, CONCLUSIONS OF LAW, AND ORDER FOR JUDGMENT

(Filed December 31, 1956)

Following the original trial in this case the Court on March 12th, 1956, made and entered its Findings of Fact, Conclusions of Law, and Order for Judgment. On March 12th, 1956, in accord with the said Findings, Conclusions, and Order the Court entered judgment herein. In said judgment the Court adjudged, decreed, declared, and ordered as follows:

"1. *It is hereby adjudged, decreed, and declared* that Claim 5 of United States Patent No. 2,605,573 issued August 5th, 1952, to Dorothy H. Madle, Administratrix of the Estate of Alain M. Madle, is invalid.

2. *It is hereby adjudged, decreed, and declared* that Claims 1, 2, 4, and 5, the latter two as corrected, of United States Patent No. 2,699,791 issued November 9th, 1954, to Leo J. Lechtenberg are invalid.

"3. *It is hereby adjudged, decreed, and declared* that Claims 1, 2, 4, 5, 6, 7, 8, 14, 15, and 16 of United States Patent No. 2,693,789 issued November 9th, to Leo J. Lechtenberg are valid.

"4. *It is hereby adjudged, decreed, and declared* that such claims are infringed by the defendant's accused VS100 engine.

"5. *It is hereby adjudged, decreed, and declared* that the plaintiff have judgment against the defendant for damages and profits for such infringement, such damages and profits to be later determined; and that the Court retains jurisdiction for the making of such determination.

"6. *It is hereby adjudged and decreed* that the defendant be and it is hereby enjoined and restrained from infringing those claims.

"7. *It is hereby adjudged* that no award of attorney fees be made to either party.

"8. *It is hereby adjudged* that each party shall pay one-half of the taxable costs taxed in the total sum of $.....

"9. *It is hereby ordered* that proceedings under this judgment be stayed until April 16th, 1956."

On March 21st, 1956, the defendant filed a motion for a clarifying opinion and a motion for an additional findings of fact, for a new trial, for extending effective date of judgment, and to amend judgment. On March 22d, 1956, the Court entered an Order extending the effective date of the judgment until June 16th, 1956. On April 2d, 1956, the defendant filed a motion to relieve the defendant from the judgment and Order of March 12th, 1956, and for a new trial with respect to the matter of the validity and infringement of Lechtenberg United States Letters Patent No. 2,693,789 to permit the defendant to present newly discovered evidence. On April 4th, 1956, a hearing was held on the post-judgment motions of the defendant. On April 9th, 1956, following that hearing on said motions the Court entered a ruling the material portions of which are as follows:

"• • • The Court, having considered said motions, is of the view that in litigation involving patents it is desirable the parties be given opportunity to present all of the evidence which they deem material or pertinent where the final decision will not be unduly delayed.

"Under Rule 59 of the Federal Rules of Civil Procedure, in an action tried without a jury the

Court may open up a judgment which has been entered for the purpose of taking additional evidence. The Court is of the view that both of the parties should be given an opportunity to present additional evidence as to any or all of the issues as to all of the patents involved.

"*It is hereby ordered* that the judgment heretofore entered on March 12th, 1956, be and the same is set aside in its entirety.

"*It is further ordered* that both of the parties be and they are hereby given leave to present additional evidence as to any or all of the issues as to all of the patents involved in this litigation, including the issue as to infringement.

"*It is further ordered* that the Court will hear such additional evidence at the Federal Court House at Dubuque, Iowa, starting on June 4th, 1956, at 10:00 o'clock A.M.

"*It is further ordered* that save so far as the post-judgment motions of the defendant are not granted or rendered moot by this Order they are overruled and denied."

On June 4th, 1956, the Court entered the following Order:

"Pursuant to motion of the plaintiff this day made in open court at the Federal Court House at Dubuque, Iowa;

"*It is hereby ordered* that the claims of the plaintiff based upon Lechtenberg Patent No. 2,693,791, referred to as the second Lechtenberg Patent, be and they are hereby dismissed."

On June 4th, 5th, and 6th, 1956, the parties presented their additional evidence. The additional evidence presented related to the validity of Claim 5 of Madle patent

No. 2,605,753, the claimed infringement of that claim by the defendant, the validity of Claims 1, 2, 4, 5, 6, 7, 8, 14, 15, and 16 of Lechtenberg patent No. 2,693,789, and the claimed infringement of those claims by the defendant. Following the submission of the additional evidence, written briefs and arguments were filed. On October 1st, 1956, oral arguments were made following which the case was submitted to the Court and by it taken under advisement. In the proceedings subsequent to March 12th, 1956, Ira Milton Jones, James R. Custin, and E. Marshall Thomas appeared as attorneys for the plaintiff. Edwin J. Balluff, Arthur Raisch, Hal F. Reynolds, Wayne G. Cook, and Charles McKinley appeared as attorneys for the defendant. Now, to-wit, on this 31st day of December, 1956, the Court now being fully advised in the premises makes and enters the following Findings of Fact, Conclusions of Law, and Order for Judgment.

FINDINGS OF FACT

1. The plaintiff, Briggs & Stratton Corporation, is a corporation organized and existing under the laws of the state of Delaware with its main office and manufacturing plant at Milwaukee, Wisconsin. The defendant, Clinton Machine Co., is a corporation organized and existing under the laws of the state of Michigan. Its main office is at Clinton, Michigan. It has manufacturing plants at Clinton, Michigan, and Maquoketa, Jackson County, Iowa. Jackson County, Iowa, is in the Eastern Division of the Northern District of Iowa. The plaintiff charges the defendant with patent infringement committed in this District. Jurisdiction is based upon Section 1338, Title 28, United States Code. Venue is based upon Section 1400 (b), Title 28, United States Code.

2. The plaintiff and the defendant are among the leading manufacturers of light internal combustion gasoline engines and they are in keen competition in that field. The greater number of the engines manufactured by them are sold to manufacturers, assemblers, and distributors of rotary lawn mowers. They are placed on and attached to such mowers for the purpose of furnishing the motive power for them. The plaintiff concentrates upon the manufacture of a single cylinder four cycle internal combustion engine. The abbreviation V.S., as used in connection with the engines hereafter referred to, stands for Vertical Shaft.

3. The plaintiff charges the defendant with infringement of United States patent No. 2,605,753 issued August 5th, 1952, to Dorothy H. Madle, Administratrix of the Estate of Alain M. Madle of which patent the plaintiff is the assignee and owner. That patent is hereafter referred to as the Madle patent. The plaintiff further charges the defendant with infringement of United States patent No. 2,693,789 issued November 9th, 1954, to L. J. Lechtenberg of which the plaintiff is also the assignee and owner.

4. At a pretrial conference held prior to the original trial, counsel for the plaintiff stated that in connection with the Madle patent the plaintiff relied upon Claims 2, 5, 6, and 10. At the beginning of the original trial the plaintiff dismissed with prejudice as to Claims 2, 6, and 10 of that patent. As to the Madle patent the plaintiff relies upon Claim 5 thereof. That patent and claim will be first considered.

5. In gasoline internal combustion engines the mixture in the combustion chamber is ignited by means of an ignition system. Breaker points are a component

part of that system. One of the breaker points is fixed and the other is movable. A spark is made at the time the points separate. It is necessary that the sparks be timed in accord with the speed and working of the engine.

6. Claim 5 of the Madle patent is given in the form set forth by the plaintiff. In the patent that claim appears without the breaks and numbers hereafter appearing:

Claim 5

In an ignition system for a single cylinder four cycle internal combustion engine of the type having a crankshaft driven magneto for effecting spark plug operation:

1. fixed and
2. movable breaker points
3. accessibly mounted on the exterior of the engine remote from the magneto;
4. a cam follower movably supported by the engine
5. remote from the breaker points;
6. a motion transmitting connection between the cam follower and the movable breaker point

   such that separation of the points is effected by motion of the cam follower in one direction;

7. a rotatable part adjacent to said cam follower;

8. a driving connection between said rotatable part and the engine crankshaft

whereby the speed of rotation of the crankshaft determines the speed of rotation of said rotatable part;

9. a member carried by said rotatable part for rotation therewith and for motion relative thereto in response to centrifugal force; and

10. a cam surface on said member engaged by said cam follower

for imparting motion to the cam follower in said direction once each revolution of the rotatable part to effect breaker point separation at instants depending upon the speed of crankshaft rotation and the position of said member relative to the rotatable part as determined by the centrifugal force acting on said member.

7. In the Madle patent reference is made to the following patents:

Number	*Name*	*Date*
1,224,247	Wacker	May 1, 1917
1,291,216	Smith	Jan. 14, 1919
1,463,958	Kettering	Aug. 7, 1923
1,636,017	Smith	July 19, 1927
1,736,441	Hendrickson	Nov. 19, 1929
1,904,308	Harmon	Apr. 18, 1933
2,013,541	Littlefield	Sept. 3, 1935
2,215,106	Lefebvre	Sept. 17, 1940

8. The defendant gave notice of many prior art patents in connection with the Madle patent. It introduced into the evidence a substantial number, but not all, of the patents of which it gave notice. The following were the patents introduced into evidence by the defendant in connection with the Madle patent:

Number	*Name*	*Date*
740,781	Sturtevant	October 6, 1903
780,221	Packard	January 17, 1905
798,992	Cochran	September 9, 1905
810,963	Motsinger	January 30, 1906
816,083	Farwell	March 27, 1907
857,715	Brillie	June 25, 1907
863,151	Churchill	August 13, 1907
906,290	Riker	December 8, 1908
1,239,689	Heaslet	September 11, 1917
1,265,454	Kettering et al	May 7, 1918
1,281,204	Pitts	October 8, 1918
1,291,216	Smith	January 14, 1919
1,401,058	Erickson	December 20, 1921
1,427,718	Brown	August 29, 1922
1,430,524	Kettering	September 26, 1922
1,463,958	Kettering	August 7, 1923
1,465,644	Kettering	August 21, 1923
1,636,017	Smith	July 19, 1927
1,792,089	Hardman	February 10, 1931
1,983,072	Davis, Jr.	December 4, 1934
2,013,541	Littlefield	September 3, 1935
2,215,106	Lefebvre	September 17, 1940
2,388,994	Phelon	November 13, 1945
Foreign Patent		
310,082	British	April 22, 1929

No additional patents relating to the Madle patent were introduced into evidence at the hearing at which the parties presented additional evidence. That hearing

will be referred to as the supplemental hearing. Both parties presented considerable additional evidence at that hearing relating to the matter of the invalidity of Claim 5 of the Madle patent and the claimed infringement of that claim by the defendant. The Court has reconsidered the matter of the validity of Claim 5 of the Madle patent in the light of all the evidence. The Court has also considered the question of infringement in the light of all the evidence.

9. In the plaintiff's brief, original hearing (pp. 6-8), the plaintiff states as hereafter set forth in regard to the invention defined by Claim 5:

> "The Madle patent relates to a magneto ignition system for a single-cylinder four stroke cycle internal combustion engine, and, so far as is material to this case, it refers more particularly to means for actuating the movable breaker point in such a magneto ignition system.
>
> "Without going into technical detail, the breaker points in an internal combustion engine comprise a pair of electrical contacts which separate or 'open' to cause a spark to jump across the spark plug electrodes. Since sparking of the plug follows instantaneously upon opening of the breaker points, breaker point opening must be timed quite accurately in relation to the rotational position of the crankshaft in order to insure that ignition of the fuel-air mixture charge in the cylinder will occur at the proper instant in the cycle of engine operation. (R. 183-184) When the engine is being started, the spark should occur relatively late in the cycle, near the instant when the piston reaches top dead center at the end of its compression stroke, but as the engine increases speed the spark should occur a substantial time before this top dead center position.

"Mechanisms were known, even before the Madle invention, for automatically advancing the spark with increasing engine speed, and this was usually accomplished by means of a centrifugally responsive mechanism which took advantage of the fact that the centrifugal force on a rotating part increases with increasing rotational speed. Prior to the Madle invention, however, all such automatic spark advance mechanisms had one or more of the following important disadvantages:

> "(1) An external lubrication system, separate and additional to that inside the engine crankcase, was required for the breaker point actuating cam and other rotating or rubbing parts in the breaker actuating mechanism. One conventional expedient for effecting lubrication was a wiper or wick at the exterior of the engine which required service from time to time. (R 578-579)
>
> "(2) The breaker points in single-cylinder engines were usually mounted behind the engine flywheel, that is, between the flywheel and its adjacent crankcase wall. Located in this position the points could not be readily serviced or replaced. Access to the points usually necessitated removal of the blower housing and then detachment of the flywheel from the crankshaft by means of a pulling tool.
>
> "(3) The breaker point actuating cam was usually mounted on the engine crankshaft and therefore rotated at crankshaft speed, causing the breakers to produce an unnecessary spark during each cycle of engine operation.

"Madle's invention was the conception of a simple structure which not only avoided every one of these disadvantages of past mechanisms but in addition was efficient, compact and trouble-free. (R 187-188)

> "By mounting the breaker actuating cam on the camshaft, instead of on the crankshaft, Madle was able to make the breaker points open only once during each engine cycle, eliminating the unnecessary spark which occurred with a crankshaft mounted cam and which shortened the life of spark plugs and breaker points. By mounting the flyweight, which actuates the cam for angular movement, on the camshaft, Madle not only achieved simplicity and compactness, utilizing the camshaft for a dual function, but, more important, he disposed the rotating and rubbing parts inside the engine crankcase where they operated in a constant spray or mist of engine lubricating oil thus obviating the need for any external lubrication system such as the wiper or wick which had theretofore been considered necessary. And by employing a simple motion transmitting connection between the movable breaker point and the cam follower inside the crankcase, Madle was able to mount the breaker points in a readily accessible location on the exterior of the engine, where they would not be likely to have oil deposited upon them."

In the plaintiff's rebuttal brief, original hearing (p. 6), the plaintiff makes the further statement:

> Defendant has ignored two key phrases in claim 5 which point directly to the invention covered thereby. The breaker points are defined as mounted on the exterior of the engine *'remote from'* the magneto; and the cam follower is defined as *'remote from'* the breaker points. For a correct understanding of the claim, these expressions cannot be disregarded."

10. The question for determination is as to what patentable invention is shown by Claim 5 and the engine manufactured in accord therewith. Fixed and movable

breaker points were not new. The advancing and retarding of the spark in proportion to the speed of the engine was not new. A camshaft driven at one-half of the crankshaft speed was not new. The placing of the breaker points outside of the crankcase and remote therefrom was not new. If Claim 5 is construed to be limited to a cam and cam follower within the crankcase for actuating the timing mechanism so that the cam and cam follower would be lubricated (which is doubtful), such construction was disclosed in the prior art. A "cam follower movably supported by the engine remote from the breaker points" was not new. A "motion transmitting connection between the cam follower and the movable breaker point such that separation of the points is effected by motion of the cam follower in one direction" was not new. A "rotatable part adjacent to said cam follower" was not new. A "driving connection between said rotatable part and the engine crankshaft whereby the speed of rotation of the crankshaft determines the speed of rotation of said rotatable part" was not new. A "member carried by said rotatable part for rotation therewith and for motion relative thereto in response to centrifugal force" was not new. A "cam surface on said member engaged by said cam follower" was not new. In Claim 7 of the Madle patent, a claim not relied on by the plaintiff in this case, after referring to the cam, it is stated: " * * * said cam overlying the opposite face of the member so that the member is interposed between said cam and the arm to guide the arm in its swinging motion; * * * " No similar statement occurs in Claim 5. In none of the prior art patents is the cam mounted on one side of the gear and the swingable centrifugally actuated arm on the other side of the gear. However, if

Claim 5 be construed to include that feature, such location would be a matter of engineering choice rather than of patentable invention. It is not clear that the plaintiff claims that the location of the parts referred to constituted patentable invention.

11. The elements set forth in Claim 5 and contained in the plaintiff's engine manufactured in accord with that claim were old and well known. However, the fact that all of such elements are old does not prevent them, when considered as a whole, from constituting patentable invention. After considering Claim 5 from that viewpoint, the Court is of the view and finds that Claim 5 is an aggregation of old elements which, in the aggregation, perform and produce no new or different function or operation than that theretofore performed or produced by them.

12. In the case of the Madle patent the accused engine is the defendant's Model 2500 engine. The defendant's claim as to its non-infringement of the Madle patent is in substance premised upon the premise that Claim 5 of the Madle patent does not define inventive combination but merely covers an aggregation of old elements. If Claim 5 of the Madle patent does define inventive combination, then the defendant's Model 2500 engine infringes that claim.

13. As heretofore noted, it is the claim of the plaintiff that the defendant's V. S. 100 engine infringes Claims 1, 2, 4, 5, 6, 7, 8, 14, 15, and 16 of the first Lechtenberg

patent, No. 2,693,789. That patent cites the following reference to patents:

Number	*Name*	*Date*
1,447,245	Gore	Mar. 6, 1923
1,463,958	Kettering	Aug. 7, 1923
2,157,666	Jacobi	May 9, 1939
2,249,319	Lohner	July 15, 1941
2,256,002	Molnar	Sept. 16, 1941
2,305,186	Muenk	Dec. 15, 1942
2,375,718	Winkels et al.	May 8, 1945
2,404,833	Forster	July 30, 1946
2,424,416	Piry	July 22, 1947
2,511,823	Klotsch	June 13, 1950
2,559,079	Leja	July 3, 1951
2,569,461	Dingman	Oct. 2, 1951
2,583,466	Brownlee	Jan. 22, 1952
2,590,134	Slonneger	Mar. 25, 1952
2,606,541	Lutz	Aug. 12, 1952
2,630,881	Bosma	Mar. 10, 1953
2,669,322	Brown	Feb. 16, 1954

Foreign Patents

Number	*Country*	*Date*
32,802	Netherlands	May 15, 1934

The defendant gave notice as to a number of claimed prior art patents in connection with the first Lechtenberg patent. At the original trial it introduced the following into evidence:

Number	*Name*	*Date*
*1,242,985	Sawtelle	Oct. 16, 1917
2,157,666	Jacobi	May 9, 1939
*2,357,942	Farr	Sept. 12, 1944
2,404,833	Forster	July 30, 1946
2,559,079	Leja	July 3, 1951
*2,627,940	Bakke	Feb. 10, 1953
2,606,541	Lutz	Aug. 12, 1952
*2,346,148	Bosma	April 11, 1944
2,630,881	Bosma	March 10, 1953
*1,276,891	Felix	Aug. 27, 1918

Those marked with an asterisk were not included in the patents to which reference was made in the patent. Those not so marked were referred to in the patent.

At the supplemental hearing the defendant relied upon the following prior art patents as anticipations and to show the state of the art in relation to Lechtenberg patent No. 2,693,789:

Number	*Name*	*Date*
615,766	Vansickle	Dec. 13, 1898
2,218,332	Fowler	Oct. 15, 1940
2,227,247	Conover	Dec. 31, 1940
2,346,148	Bosma	April 11, 1944
2,097,662	Hennecke	Nov. 2, 1937
2,417,195	Hargreaves	March 11, 1947
2,627,940	Baake	Feb. 10, 1953

The Bosma and Baake patents were in evidence at the original hearing but were not discussed. The defendant prior to the original trial specially pleaded the Vansickle patent but did not put it in evidence at that trial. The Conover, Fowler, Hennecke, and Hargreaves patents were put into evidence at the supplemental hearing. At the supplemental hearing the defendant also relied on prior use and it presented considerable evidence as to claimed prior use. In that connection the defendant relied upon an engine referred to as the "Lauson" engine which was manufactured and sold by the Lauson Company of New Holstein, Wisconsin, from 1941 to 1947. In that connection it also relied upon the prior use of its single-cylinder four stroke cycle air cooled Model 700 engine. The defendant stresses that none of the prior art patents last above referred to or prior public uses were cited by the Patent Office against the application of the Lechtenberg patent in question. Claims 1, 2, 4, 5, 6, 7, 8, 14, 15, and 16 of the first Lechtenberg patent are as follows:

> "1. A single cylinder internal combustion engine having a crankcase with two spaced apart side walls, each of which carries a crankshaft bearing, a cylinder

and a crankshaft journaled in the bearings with its ends projecting from the crankcase, one end of the crankshaft having a flywheel mounted thereon and the other end being the power take-off end of the shaft, characterized by the fact that: the cylinder and all portions of the crankcase including the wall thereof remote from and facing the cylinder, except that wall of the crankcase which carries the bearing for the power take-off end of the crankshaft is a single casting; and further by the fact that said wall of the crankcase which carries the bearing for the power take-off end of the crankcase is provided by a cover removably secured to said casting so that said cover is interchangeable with others of different design to adapt the engine to any of a variety of different installations without necessitating alteration of the cylinder-crankcase casting.

"2. A single cylinder four-stroke cycle internal combustion engine having a crankshaft, a cam shaft parallel to the crankshaft, a cylinder and a crankcase, through opposite walls of which the ends of the crankshaft pass, one end of the crankshaft having a flywheel thereon and the other end being the power take-off end of the crankshaft, characterized by the fact that: the cylinder and all portions of the crankcase including the wall thereof remote from and facing the cylinder, except that wall of the crankcase through which the power take-off end of the crankshaft passes, is one casting; by the fact that said wall through which the power take-off end of the crankshaft passes is provided by a cover removably secured to said casting; by the fact that the crankshaft and the cam shaft are supported by said cover and the wall of the casting opposite the cover; and by the fact that the supports for the cam shaft comprise wells in the cover and said opposite wall of the casting.

"4. The engine defined in claim 2 further characterized by the fact that said cover has a relatively

deep depression in its inner face so that when the engine is positioned to operate with its cylinder horizontal and said cover at the bottom of the engine, the depression in its inner face provides an oil sump; and characterized further by the fact that the cover has a boss projecting from its inner face and bored through to provide a bearing for the adjacent end of the crankshaft, said boss extending for substantially the full depth of the depression in the cover so that oil in the depression rising to a level substantially equal to the full depth of the depression, when the engine is used with its cylinder horizontal, will not drain out along the crankshaft when the engine is idle.

"5. A single cylinder, four-stroke cycle internal combustion engine adapted for operation with its cylinder horizontal, said engine having in addition to its cylinder a crankshaft, a cam shaft parallel to the crankshaft, and a crankcase with spaced apart top and bottom walls through which the upper and lower ends of the crankshaft pass, said engine being characterized by the fact that: the cylinder and all portions of the crankcase except its bottom wall through which the lower end of the crankshaft passes is one casting; by the fact that said bottom wall comprises a cover having a relatively deep depression removably secured to the casting with the edge of the depression joining the casting on a plane parallel to said top and bottom walls and below the cylinder, by the fact that the cam shaft is supported by the cover and the top wall of the crank case and the bearings for the crankshaft are in said cover and the top wall of the crankcase; further by the fact that the depression in the cover provides an oil sump and has an oil filler port therein communicating with the depression below the top edge thereof with the mouth of the filler port on a level no higher than the edge of the depression so that the level of

the oil in the sump will not be above the edge of the depression; and said cover being further characterized by a pair of bosses projecting up from the bottom of its depression, one of said bosses being bored through and providing the bearing for the lower end of the crankshaft, and the other boss having a well, closed at its bottom extending down into it and providing a support for the lower end of the cam shaft, the boss providing the lower crankshaft bearing extending substantially to the level of the edge of the depresison (sic) in the cover so that when the engine is idle the oil in the sump will not be drained therefrom through said crankshaft bearing.

"6. A single cylinder, four-stroke cycle internal combustion engine adapted for operation with its cylinder horizontal, said engine having in addition to its cylinder a crankshaft, a cam shaft parallel to the crankshaft, and a crankcase with spaced apart top and bottom walls through which the upper and lower ends of the crankshaft pass, said engine being characterized by the fact that: the cylinder and all portions of the crankcase except its bottom wall through which the lower end of the crankshaft passes is one casting; by the fact that said bottom wall comprises a cover removably secured to the casting and having a relatively deep depression; by the fact that the cam shaft is supported by the cover and the top wall of the crank case and the bearings for the crankshaft are in said cover and the top wall of the crankcase; further by the fact that the depression in the cover provides an oil sump[;] and said cover being further characterized by mounting means formed integrally therewith for mounting the engine with its cylinder horizontal.

"7. The engine defined in claim 6 but wherein said mounting means for the engine comprises a substantially circular flange on the cover having a flat down-

wardly facing rim concentric to the crankshaft axis and adapted to seat upon a flat surface.

"8. The engine defined in claim 6 but wherein said mounting means for the engine extends from the region of the oil sump towards the cylinder head to thereby enable the mounting means to provide a large mounting area without greatly increasing the outline of the engine.

"14. In an engine of the character described: a cylinder and a crankcase formed as one casting, the crankcase being open at its bottom; a cover closing the open bottom of the crankcase, said cover having a depression therein providing an oil sump for the engine; bearings for the crankshaft of the engine carried by the cover and the wall of the crankcase opposite the cover; said cover having an oil filler port provided by a well extending down from the top of the cover alongside the depression in the cover, the top of said well providing the mouth of the port and lying substantially on a plane with the top edge of the depression; and the cover having an oil drain port in its bottom provided by a bore parallel to the oil filler port but lying between said port and the adjacent wall of the depression and breaking through both the wall of the depression and the oil filler port to thereby communicate the oil filler port with the interior of the depression; and removable caps for closing both the oil filler port and said oil drain port.

"15. In an engine of the character described, the structure set forth in claim 14 further characterized by the provision of a boss projecting from the bottom of the depression in the cover, said boss being bored through and providing the bearing for the lower end of the crank shaft and having a height to reach substantially to the level of the mouth of the filler port so that oil in the sump cannot drain out through the lower crank shaft bearing when the engine is idle.

"16. A single cylinder four-stroke cycle internal combustion engine having a crankshaft, a cylinder and a crankcase through opposite walls of which the ends of the crankshaft pass, one end of the crankshaft having a flywheel thereon and the other end being the power take-off end of the crankshaft, characterized by the fact that: the engine is designed to be used with its cylinder horizontal with the walls of the crankcase through which the crankshaft passes being the top and bottom walls of the crankcase and with the flywheel adjacent to the top wall and the power take-off end of the crankshaft projecting down from the bottom wall; by the fact that the cylinder and all portions of the crankcase including the wall thereof remote from and facing the cylinder, except the bottom wall through which the power take-off end of the crankshaft passes is one integral casting; by the fact that said bottom wall is provided by a cover removably secured to said casting; by the fact that the crankshaft and the cam shaft are supported by said cover and the top wall of the crankcase; by the fact that said cover has a relatively deep upwardly opening depression which provides an oil sump; and characterized further by the fact that the cover has a boss projecting upwardly from its inner face and bored through to provide a bearing in which the lower end of the crankshaft is rotatably supported, said boss extending for substantially the full depth of the depression in the cover so that oil in the depression rising to a level equal to the full depth of the depression will not drain out along the crankshaft when the engine is idle."

14. The plaintiff, following extensive experiments in January, 1953, placed on sale a die cast aluminum one cylinder four cycle air cooled gasoline engine. Soon thereafter the defendant brought out its V.S. 100 engine which is the accused engine. The structure of the plaintiff's en-

gine is in accord with the disclosure contained in Lechtenberg patent No. 2,693,789. The plaintiff's engine met and is meeting with marked commercial success. In the plaintiff's engine the crankcase and cylinder is cast as one integral unit. That unit is the main and most expensive part of the engine. Engines of the type here involved have a cover casting which is removable. In the plaintiff's engine the removable cover is at the bottom of the engine with the crankshaft protruding through it. Engines of the type here involved are designed to be installed on other pieces of equipment to furnish the motive power for them. It is indicated that there are 36 possible uses to which engines of the type here involved may be put. Engines of the type here involved are installed on various decks or platforms of various types and kinds of equipment. The plaintiff's bottom cover casting is interchangeable with shapes of covers of different designs so as to adapt the engine to a variety of installations without any alteration in the cylinder crankcase casting. By using aluminum the plaintiff substantially reduced the weight of the engine. By die casting the plaintiff reduced the cost of the engine. By means of the bottom cover the plaintiff greatly increased the adaptability of the engine. It is clear that the plaintiff's engine is light, compact, reasonably priced, highly adaptable, and outstanding in its field. The question for determination is whether the structure disclosed by Lechtenberg patent No. 2,693,789 discloses patentable invention, or merely a high degree of artisanship.

15. The casting of the cylinder and crankcase as an integral unit was not new. The die casting of engine parts was not new. The use of aluminum was not new. Having one wall of the engine removable was not new.

Having the bottom cover of the engine removable was not new.

16. In its original Findings. The Court made the following finding:

> "The patent discloses a separation of the bottom cover casting and the cylinder crankcase casting in such a way and manner that all of the constants are in the main and the more expensive casting and all of the variables are in the inexpensive bottom cover casting. That feature was not disclosed in the prior art and was new. The Court finds that such disclosure constituted patentable invention. Such disclosure appears more specifically and definitely in some of the claims than it does in others, but it more or less inheres in all of the claims."

In the light of the additional prior art patents introduced into evidence at the supplemental hearing and further development of the prior art patents introduced into evidence at the original trial and the evidence as to prior use introduced at the supplemental hearing, the Court is of the view that its finding as to patentable invention was erroneous. The word "variables" as used in that finding by the Court signified those features of bottom cover castings by means of which the engine could be adapted to various and different uses. Therefore, that finding was premised upon the adaptability of the engine disclosed by Lechtenberg patent No. 2,693,789 to various and different uses by means of interchangeable cover plates. It now appears that the adaptability of engines to various and different uses by means of interchangeable bottom parts was not new. Such adaptability was disclosed in the Vansickle, Conover, and Bosma patents. It now appears beyond a reasonable doubt that the use of such interchangeable parts to adapt an engine to va-

rious and different uses was not new. It now appears beyond a reasonable doubt that prior to Lechtenberg patent No. 2,693,789 there was wide prior use of interchangeable parts to adapt an engine to various and different uses.

17. The Court now finds that none of the disclosures in Lechtenberg patent No. 2,693,789 constitute patentable invention in view of the prior art and prior use. The Court finds that Claims 1, 2, 4, 5, 6, 7, 8, 14, 15, and 16 of Lechtenberg patent No. 2,693,789 constitute an aggregation of old elements which, in the aggregation, perform and produce no new or different function or operation than that heretofore performed or produced by them.

18. The engine produced by the plaintiff in accord with the disclosures of the Lechtenberg patent represents a high degree of artisanship and an excellent piece of engineering. However, the disclosures do not amount to patentable invention.

19. At the original hearing the defendant did not claim or argue that its V.S. 100 engine did not infringe the Lechtenberg patent if that patent was valid. The attack of the defendant at the original hearing was confined to the matter of the validity of that patent. At the supplemental hearing the defendant claimed that even if the Lechtenberg patent was valid its V.S. 100 engine did not infringe and offered evidence in support of that claim.

20. The defendant's accused engine has a cylinder liner which does not appear in the disclosures of the Lechtenberg patent or in the engine manufactured by the plaintiff in accord therewith. Save in the matter of the cylinder

liner, the defendant's accused engine is a striking and almost slavish copy of the plaintiff's engine. If the claims of Lechtenberg patent No. 2,693,789 do define inventive combination, the defendant's accused engine clearly infringes.

21. The Court finds that the circumstances are such that no award of attorney fees should be made to the defendant.

22. The Court finds that the circumstances are such that each party should be assessed one-half of the taxable costs.

CONCLUSIONS OF LAW

1. This Court has jurisdiction of the parties to this action and of the subject matter of this action.

2. Claim 5 of Madle patent No. 2,605,753 is invalid as lacking in invention over the prior art.

3. Claims 1, 2, 4, 5, 6, 7, 8, 14, 15, and 16 of Lechtenberg patent No. 2,693,789 are invalid as lacking in invention over the prior art.

4. No attorney fees should be awarded to the defendant.

5. Each party should pay one-half of the taxable costs of this action.

ORDER FOR JUDGMENT

It is hereby ordered that judgment shall be entered adjudging, decreeing, and declaring:

1. that Claim 5 of Madle patent No. 2,605,753 is invalid;
2. that Claims 1, 2, 4, 5, 6, 7, 8, 14, 15, and 16 of Lechtenberg patent No. 2,693,789 are invalid.
3. that no award of attorney fees should be made to the defendant;
4. that each party pay one-half of the taxable costs.

s/ Henry N. Graven

Henry N. Graven,
United States District Judge.

The above is a true copy.

Attest:
Lee McNeely, Clerk.

By

Deputy Clerk.

JUDGMENT

On March 12th, 1956, following the original trial herein, the Court made and entered herein its Findings of Fact, Conclusions of Law, and Order for Judgment and Judgment. On April 9th, 1956, the Court set aside said Findings, Conclusions, Order for Judgment and Judgment and reopened the case for the presentation of additional evidence as to all of the issues in the case. On June 4th, 5th, and 6th, 1956, the parties presented their additional evidence. Following the submission of the additional evidence, written briefs and arguments were filed. On October 1st, 1956, oral arguments were made, following which the case was submitted to the Court and by it taken under advisement. Ira Milton Jones, James R. Custin, and E. Marshall Thomas appeared as attorneys for the plaintiff. Edwin J. Balluff, Arthur Raisch, Hal F. Reynolds, Wayne G. Cook, and Charles McKinley appeared as attorneys for the defendant. On December 31st, 1956, the Court filed herein its Findings of Fact, Conclusions of Law, and Order for Judgment. Now, therefore, in accord with said Findings, Conclusions, and Order;

It is hereby adjudged, decreed, and declared that Claim 5 of United States Patent No. 2,605,753 issued August 5th, 1952, to Dorothy H. Madle, Administratrix of the Estate of Alain M. Madle, is invalid.

It is further adjudged, decreed, and declared that Claims 1, 2, 4, 5, 6, 7, 8, 14, 15, and 16 of United States Patent No. 2,693,789 issued November 9th, 1954, to Leo J. Lechtenberg are invalid.

It is further adjudged that no award of attorney fees be made to the defendant.

It is further adjudged that each of the parties shall pay one-half of the taxable costs taxed in the total sum of $.....

Signed in the Northern District of Iowa this 31st day of December, 1956, for entry in the Eastern Division.

/s/ Henry N. Graven

Henry N. Graven,
United States District Judge.

The above is a true copy.

Attest:

Lee McNeely,
Lee McNeely, Clerk.

By

Deputy Clerk.

NOTICE OF APPEAL TO COURT OF APPEALS

Please take notice that Briggs & Stratton Corporation, plaintiff above named, hereby appeals to the United States Court of Appeals for the Eighth Circuit from the Final Judgment entered in this action on December 31, 1956.

Ira Milton Jones
110 East Wisconsin Avenue
Milwaukee 2, Wisconsin

January 25, 1957

Counsel for Plaintiff

Of Counsel:
E. Marshall Thomas
609 Fischer Building
Dubuque, Iowa

NOTICE OF CROSS-APPEAL

(Filed January 30, 1957)

Notice is hereby given that, contingent upon and effective only in the event of the filing of an appeal by plaintiff Briggs & Stratton Corporation from the Judgment of this Court entered December 31, 1956, in the above identified suit, defendant Clinton Machine Co., Inc. appeals to the United States Court of Appeals for the Eighth Circuit from that portion of the decision entered December 31, 1956, in effect holding United States patents 2,693,789 and 2,605,753 infringed by defendant, and from the failure of the said Judgment to grant defendant all of the relief asked in its counterclaim and specifically from the failure to enter judgment on said counterclaim that said patents 2,693,789 and 2,605,753, if valid, are not infringed by defendant.

CLINTON MACHINE CO., INC.,
Defendant

By Edwin J. Balluff

Edwin J. Balluff
Attorney for Defendant

3153 Penobscot Building
Detroit 26, Michigan

RELEVANT DOCKET ENTRIES IN DISTRICT COURT

1954

Dec. 9 Filed Complaint.

Dec. 9 Issued Summons and delivered same, with attested copy thereof and copy of the Complaint to U. S. Marshal's office at Dubuque for service.

Dec. 9 Mailed to Commissioner of Patents, Washington, D. C., report on Form 789, of the filing of this cause of action.

Dec. 10 Issued Summons for service on Defendant, Clinton Machine Co., Inc. by serving Arthur F. Janssen, Iowa Resident Agent for Clinton Machine Co., Inc., and delivered same, with attested copy thereof and copy of the Complaint to U. S. Marshal's office at Dubuque for service.

Dec. 10 Filed Summons with Marshal's return thereon showing service on Defendant by serving L. J. Socks, General Manager and General Managing Agent of the Clinton Machine Co., Inc., at Maquoketa, Iowa, on December 9, 1954.

Dec. 13 Filed Summons with Marshal's return thereon showing further service on Clinton Machine Company, Inc., by serving Arthur F. Janssen, Iowa Resident Agent for the said Company at Maquoketa, Iowa, on December 11, 1954 at 2:00 o'clock P.M.

Dec. 29 Filed Appearance of Thos. S. Donnelly, Detroit, Michigan and Messrs. Kenline, Roedell, Hoffmann & Reynolds, Dubuque, as counsel for Defendant.

Dec. 29 Filed Stipulation of parties for extension of time to and including January 20, 1955, for Defendant to file Answer or otherwise plead.

Dec. 30 Filed and entered Court Order made this date extending time to and including January 20, 1955, for the Defendant to Answer or otherwise plead.

Dec. 31 Attested copy of above Order mailed this date to all counsel of record.

1955

Jan. 14 Filed Appearance of Edward M. Apple, Detroit, Michigan, as of counsel for Defendant.

Jan. 14 Filed Defendant's Answer and Counter-Claim; with endorsement thereon by Mr. E. Marshall Thomas, Dubuque, of counsel for Plaintiff, showing receipt of copy on January 13, 1955.

Jan. 19 Filed and entered Court Order made this date assigning this case for pre-trial conference at Dubuque, Iowa, on January 27, 1955, at 9:00 A.M.

Jan. 20 Attested copy of above Order mailed this date to all counsel of record.

Jan. 26 Filed Plaintiff's Reply to Counterclaim.

Jan. 27 Filed and entered Court Order made this date on pretrial conference held at Dubuque on January 27, 1955.

Jan. 27 Filed and entered Court Order made this date assigning this case for Court Trial at Dubuque on April 18, 1955, at 10:00 A.M.

Jan. 27 Attested copies of last two above noted Orders mailed this date to all counsel of record.

Feb. 7 Filed withdrawal of appearance of Edward M. Apple, Attorney, Detroit Michigan, as counsel for defendant.

Feb. 8 Filed certified Transcript of Arthur L. Bye, Official Court Reporter, of proceedings at pre-trial conference held at Dubuque on January 27, 1955.

Feb. 24 Filed Plaintiff's Interrogatories to Defendant with Proof of Service thereof on Defendant's counsel.

Feb. 24 Received from Mr. E. Marshall Thomas, of counsel for Plaintiff, and filed certified copies of the file wrapper and contents of application for Patent No. 653,493; application for Patent No. 108,293; Patent No. 2,605,753; Patent No. 2,693,789; and Patent No. 2,693,791; identified at the Pretrial Conference as Exhibits 1A, 1B, 1C, 2A, and 3A respectively.

Mar. 4 Received and filed Depositions of Hugh S. Brown, Joseph R. Harkness, and Leo J. Lechtenberg, taken on behalf of Defendant in Milwaukee, Wisconsin before Edna W. Knueppel, Notary Public, on Feb. 8, 1955.

Mar. 4 Filed Notice of prior public use and additional prior art, by Defendant, with endorsement thereon showing copy of same received on February 28, 1955, by counsel for Plaintiff.

Mar. 4 Filed Defendant's Application of prior art cited, with endorsement thereon showing copy of same received on February 20, 1955, by counsel for Plaintiff.

Mar. 7 Filed Stipulation signed by the parties relative to sample engines identified as 6BHX which were shipped by Plaintiff to various customers throughout the United States during January 1953 and invoiced to the customers on sixty day experimental terms.

Mar. 11 Filed Defendant's Answer to Plaintiff's Interrogatories; with endorsement thereon showing receipt of copy by Plaintiff's counsel on March 11, 1955.

Mar. 11 Filed Additional Interrogatories Propounded by Plaintiff to Defendant; with endorsement thereon showing receipt of copy by Defendant's counsel on March 11, 1955.

Mar. 15 Filed Plaintiff's References Cited in File of Madle' U. S. Patent No. 2,605,753.

Mar. 15 Filed Plaintiff's References Cited in File of Lechtenberg U. S. Patent No. 2,693,789.

Mar. 15 Filed Plaintiff's References Cited in File of Lechtenberg U. S. Patent No. 2,693,791.

Mar. 18 Filed Defendant's Notice of Prior Public use and sale of certain patents in addition to that heretofore noticed.

Apr. 1 Filed Defendant's Answers to Plaintiff's Interrogatories.

Apr. 11 Filed and entered Court Order made this date changing the hour of trial to 1:30 o'clock P.M. on April 18, 1955, instead of 10:00 o'clock A.M. on that date.

Apr. 11 Attested copy of above Order mailed this date to all counsel of record.

Apr. 12 Filed Defendant's Notice of Additional Prior Art; with endorsement thereon showing receipt of copy by Plaintiff's counsel on April 11, 1955.

Apr. 18 Filed and entered Court Order made this date as to record of Transcript.

Apr. 18 Filed and entered Court Order made this date as to record of Claims in connection with United States Letters Patent No. 2,605,753.

Apr. 19 Attested copies of last two above-noted Orders delivered to all counsel.

April 18, 19, 20, 21 & 22, 1955. COURT TRIAL.

Apr. 20 Filed and entered Court Order made this date granting Plaintiff leave to file its proffered Supplemental Complaint.

Apr. 20 Filed Plaintiff's Supplemental Complaint.

Apr. 22 Filed and entered Court Order made this date as to submission.

Apr. 22 Attested copies of last two above-noted Orders were mailed to Plaintiff's counsel, and delivered to Defendant's counsel.

Apr. 22 Filed Plaintiff's Exhibits 1, 1a, 1b, 2, 2a, 2b, 3, 3a, 3b, 3c, 3d, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 14a, 14b, 14c, 14d, 14d prime, 14e, 14f, 15, 15a, 15b, 15c, 15d, 15e, 15f, 16, 16a, 16b, 16c, 16d, 17a, 17b, 17c, 17d, 18a, 18b, 18c, 19, 20a, 20b, 20c, 20d, 21a, 21b, 21c, 21d, and 22.

Apr. 22 Filed Defendant's Exhibits D-2, (following have prefix D), 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68 and 69.

May 2 Received and filed Deposition of Arthur Eaton and George Rose, witnesses called by the Defendant, taken before Bernard W. Nycz, Notary Public, within and for the County of Wayne, State of Michigan, on Thursday, March 24, 1955.

Aug. 18 Filed Plaintiff's Brief.

Sept. 12 Filed Defendant's Brief.

Sept. 20 Filed Stipulation of parties regarding corrections to transcript of record.

Sept. 23 Filed Second Stipulation of parties regarding corrections to transcript of record.

Sept. 27 Filed Rebuttal Brief for the Plaintiff; with acceptance of service of copy endorsed thereon by Defendant's counsel on Sept. 27, 1955.

Sept. 30 Filed and entered Memorandum by the Court requesting counsel to advise the Court of any conflicting engagements during second or third weeks of December in connection with fixing time for oral arguments at Dubuque.

Sept. 30 Attested copies of above Memorandum mailed this date to all counsel of record.

Oct. 3 Filed Transcript (in 2 Volumes) of proceedings at the trial of this cause, started April 18, 1955, certified by Arthur L. Bye, Official Court Reporter.

Nov. 29 Filed and entered Court Order made this date assigning Oral Arguments for hearing at Dubuque, Iowa, on Wednesday, December 21, 1955 at 1:30 o'clock P.M.

Nov. 29 Attested copy of above Order mailed this date to all counsel of record.

Dec. 21 Filed and entered Court Order made this date taking this case under advisement.

Dec. 23 Attested copies of above Order mailed this date to all counsel of record.

1956

Jan. 10 Filed Proposed Findings of Fact and Conclusions of Law Suggested by Defendant.

Mar. 12 Filed and entered Findings of Fact, Conclusions of Law, and Order for Judgment rendered by Judge Graven on March 12, 1956.

Mar. 12 Filed and entered Judgment rendered by Judge Graven on March 12, 1956 declaring that: Claim 5 of U.S. Patent No. 2,605,573 issued August 5, 1952 to Dorothy H. Madle, Administratrix of estate of Alain M. Madle is invalid; that claims 1, 2, 4, and 5, the latter two, as corrected, of U.S. Patent No. 2,699,791 issued Nov. 9, 1954, to Leo J. Lechtenberg are invalid; and Claims 1, 2, 4, 5, 6, 7, 8, 14, 15 and 16 of U. S. Patent No. 2,693,789 issued November 9, 1954 to Leo J. Lechtenberg are valid; that such claims are infringed by Defendant's accused V. S. 100 engine; that Plaintiff have Judgment against Defendant for damages and profits for such infringement, such damages and profits to be later determined, the Court to retain jurisdiction for making such determination; Defendant enjoined and restrained from infringing those claims; no award of attorney fees to be made to either party; each party to pay one-half taxable costs taxed; proceedings under said Judgment to be stayed until April 16, 1956.

Mar. 12 Entered Judgment this date for one-half costs against each party.

Mar. 12 Attested copy of Findings of Fact, Conclusions of Law, and Order for Judgment, and Judgment mailed to all counsel of record.

Mar. 12 Filed Copy of Report on Form 789 mailed to Commissioner of Patents, Washington, D. C. as to Judgment rendered by Court on March 12, 1956.

Mar. 21 Filed Defendant's Motion for Clarifying the Opinion, with Proof of Service endorsed thereon.

Mar. 21 Filed Defendant's Motion for Additional Findings of Fact with Proof of Service endorsed thereon.

Mar. 21 Filed Defendant's Petition for a New Trial with Proof of Service endorsed thereon.

Mar. 21 Filed Defendant's Motion for Extending Effective Date of Judgment until June 16, 1956 with Proof of Service endorsed thereon.

Mar. 21 Filed Defendant's Motion to Amend Judgment with Proof of Service endorsed thereon.

Mar. 22 Filed and entered Court Order made this date assigning Defendant's Motions for hearing at Dubuque, Iowa, on April 4, 1956 at 4:00 o'clock P.M.

Mar. 22 Attested copy of above Order mailed this date to all counsel of record.

Mar. 23 Filed Notice of Withdrawal of Appearance of Thos. S. Donnelly as attorney for Defendant with approval by the Court noted thereon.

Mar. 23 Filed Appearance of Edwin J. Balluff, 3153 Penobscot Building, Detroit 26, Michigan, as counsel for Defendant, with Proof of service showing copy mailed to Plaintiff's Counsel.

Mar. 31 Filed Affidavit of Rudolph L. Lowell, of Des Moines, Iowa, with copies of Bosma patent No. 2,346,148, and Van Sickle patent No. 615,766 attached thereto and made a part thereof.

Apr. 2 Filed Appearance of Arthur Raisch, 1509 Ford Building, Detroit 26, Michigan, as attorney for Defendant, with Proof of Service noted thereon.

Apr. 2 Filed Defendant's Motion to Relieve Defendant from the Judgment and Order of March 12, 1956, based on Lechtenberg United States Letters Patent No. 2,693,789.

and

Motion for a New Trial with respect to the matter of validity and infringement of Lechtenberg United States Letters Patent No. 2,693,789, to permit the Defendant to present new evidence, with Proof of Service attached thereto.

Apr. 2 Filed Affidavit of Cletus Erlacher of Maquoketa, Iowa.

Apr. 2 Filed Affidavit of LaVerne Socks of Maquoketa, Iowa.

Apr. 2 Filed Affidavit of Harold Bruns of New Holstein, Wisconsin.

Apr. 4 Filed Plaintiff's Memorandum re Defendant's Motions after Judgment.

Apr. 4 Filed Appearance of Wayne G. Cook for Cook, Blair & Balluff, Putnam Building, Davenport, Iowa, as counsel for Defendant.

Apr. 4 Filed Affidavit of Joseph L. Forinash.

Apr. 4 Filed Affidavit of Richard W. Muerle.

Apr. 4 Filed Affidavit of Paul W. Hainke.

Apr. 4 Filed Affidavit of Kenneth Agar.

Apr. 4 Filed Affidavit of Clarence P. Damon.

Apr. 4 Filed Memorandum in support of Defendant's Motions.

Apr. 4 Filed Memorandum in support of Defendant's Motion for Additional Findings of Fact.

Apr. 4 Filed and entered Court Order made this date taking under advisement Defendant's post-judgment motions.

Apr. 6 Attested copy of last above-noted Order mailed this date to all counsel of record.

Apr. 9 Filed Plaintiff's Memorandum Waiving Certain Objections to Defendant's Motion for a New Trial.

Apr. 9 Filed and entered Court Order made this date setting aside in its entirety Judgment heretofore entered on March 12, 1956; granting leave to both parties to present additional evidence as to any or all issues as to all patents, including issue as to infringement; assigning this matter for hearing of additional evidence at Dubuque, Iowa, on June 4, 1956 at 10 o'clock A.M.; and overruling and denying those motions of Defendant which are not granted or rendered moot by this Order.

Apr. 9 Attested copy of above-noted Order mailed this date to all counsel of record.

Apr. 10 Filed Certificate of Service of E. Marshall Thomas, of counsel for Plaintiff, showing copy of Plaintiff's Memorandum Waiving Certain Objections to Defendant's Motion for New Trial mailed to counsel for Defendant on April 9, 1956.

May 31 Filed Original and Duplicate of Deposition of Harold E. Bruns taken on behalf of Defendant before Stanley H. Enockson, Notary Public, at New Holstein, Wisconsin, on May 25, 1956.

May 31 Filed original and Duplicate of Deposition of W. C. Conover taken on behalf of Plaintiff before Helen Ruud, Notary Public at Milwaukee, Wisconsin, on May 29, 1956.

June 4 Filed and entered Court Order made this date as to Transcripts to be furnished by Court Reporter.

June 4 Filed and entered Court Order made this date appointing Carl V. Riley, Relief Reporter, in this case.

June 4 Filed and entered Court Order made this date dismissing the claims of Plaintiff based upon Lechtenberg Patent No. 2,693,791, referred to as the second Lechtenberg Patent.

June 5 Attested copies of last above three Orders delivered this date to all counsel of record by Lee McNeely, Clerk.

June 6 Filed Reporter's Transcript of proceedings at hearing on Defendant's Motions at Dubuque, Iowa, on April 4, 1956 certified by Arthur L. Bye, Official Court Reporter.

June 6 Filed and entered Court Order made this date relating to submission of case.

June 6 Filed and entered Court Order made this date fixing compensation in the sum of $50.00 for Relief Reporter, and directing that the same be included in the taxable costs.

COURT TRIAL June 4, 5, and 6 at Dubuque, Iowa.

June 7 Attested copies of last two Orders mailed this date to all counsel of record.

Aug. 2 Received and Filed Reporter's Transcript, in three volumes, of Additional Testimony of Trial to Court

on June 4, 5, 6, 1956 certified by Arthur L. Bye, Official Federal Court Reporter and by Carl V. Riley, Assistant Official Federal Court Reporter.

Aug. 14 Filed Letter from Carl V. Riley, Assistant Official Federal Court Reporter, amending transcript of proceedings of Court Trial at Page 496, Line 15.

Aug. 21 Filed Defendant's Brief.

Aug. 25 Filed Affidavit of Florence M. Chamberlin showing two copies of Defendant's Brief mailed to Ira Milton Jones, 110 E Wisconsin Avenue, Milwaukee 2, Wisconsin, and to E. Marshall Thomas, 609 Bank and Insurance Building, Dubuque, Iowa, on August 17, 1956.

Sept. 7 Filed Plaintiff's Reply Brief on Additional Evidence.

Sept. 14 Filed Original and Duplicate of Defendant's Reply Brief.

Sept. 17 Filed and entered Court Order made this date assigning Oral Arguments in this case for hearing at Dubuque, Iowa, on October 1, 1956 at 2:00 o'clock P.M.

Sept. 18 Attested copies of above-noted Order mailed this date to all counsel of record.

Oct. 1 Received and Filed Court Reporters' File Copy of Transcript, in three volumes, of Additional Testimony of Trial to Court on June 4, 5, 6, 1956.

Oct. 1 Filed Defendant's Proposed Findings of Fact and Conclusions of Law.

Oct. 1 Filed and entered Court Order made this date taking this case under advisement after oral arguments heard at Dubuque this date.

Oct. 2 Attested copy of above Order mailed this date to all counsel of record.

Dec. 8 Filed two Stipulations of the parties through their counsel of correction to transcript of oral arguments had on October 1, 1956.

Dec. 8 Filed Reporter's Transcript of oral arguments had on October 1, 1956.

Dec. 31 Filed and entered Findings of Fact, Conclusions of Law, and Order for Judgment on December 31, 1956.

Dec. 31 Filed and entered Judgment rendered by Judge Graven on December 31, 1956 declaring that: Claim 5 of U.S. Patent No.2605573 issued August 5, 1952 to Dorothy H. Madle, Administratrix of the Estate of Alain M. Madle is invalid; that Claims 1, 2, 4, 5, 6, 7, 8, 14, 15 and 16 of U.S. Patent No. 2,693,789, issued November 9, 1954, to Leo J. Lechtenberg are invalid; no award of attorney fees to be made to Defendant; each party to pay one-half taxable costs taxed in the sum of $ .....

Dec. 31 Attested copy of Findings of Fact, Conclusions of Law, and Order for Judgment, and Judgment sent to counsel.

Dec. 31 Entered Judgment this date for one-half costs against each party.

1957

Jan. 5 Filed Copy of Report on Form AO 120 mailed to Commissioner of Patents, Washington, D. C. as to Judgment rendered by Court on December 31, 1956.

Jan. 25 Filed Plaintiff's Notice of Appeal to Court of Appeals.

Jan. 26 Filed Stipulation of the Parties through their counsel that Plaintiff-Appellant be relieved from the necessity of filing with the U.S. Court of Appeals for the 8th Circuit a cost bond on Appeal, with Court Order approving same.

Jan. 29 Filed Clerk's Certificate of Mailing copies of Plaintiff's Notice of Appeal to Attorneys of Record for Defendant.

Jan. 30 Filed Defendant's Notice of Cross-Appeal.

Jan. 31 Filed Clerk's Certificate of Mailing Copies of Notice of Cross-Appeal to Attorneys of Record for Cross-Appellee.

Feb. 5 Filed Plaintiff-Appellant's Designation of Contents of Record on Appeal.

Feb. 5 Filed Affidavit in Proof of Service of Plaintiff's Designation of Contents of Record on Appeal on counsel representing Defendant, on February 4, 1937.

Feb. 6 Filed Plaintiff-Appellant's Designation of Contents of Printed Record with proof of service endorsed thereon.